THE ROLE OF BUSINESS AND SOCIAL TIES IN ORGANIZATIONAL KNOWLEDGE SHARING: A CASE STUDY OF A FINANCIAL INSTITUTION

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This thesis is built on the assumption that organizations are in important respect social networks, whereby knowledge is socially constructed and shared. Social network analysis (SNA) was employed to investigate the strength of inter-unit ties among twenty two units within a financial organization. The association of these ties with the sharing of different types of knowledge was measured by a specifically created and developed web survey that was provided to twenty two units in a financial institution .

Multiple Regression Quadratic Assignment Procedure (MRQAP) was used to examine two main questions and hypothesis. First and foremost, was to determine if there were associations between the strength of business and social ties and the sharing of different types of knowledge, *i.e. public* (noncodified vs. codified) and *private* (noncodified vs. codified). Second, to establish which of the two dimensions of strength -- closeness of a relationship, or the frequency of interaction – served as a stronger predictor for sharing of the four different kinds of knowledge the thesis delineated.

Results showed that the strength of the business relationships rather than the strength of the social relationships contributed most significantly to the sharing of public and private knowledge

in this organization. Specifically, the frequency of business interactions predicted the sharing of public noncodified knowledge, while the closeness of the business relationship predicted the sharing of private noncodified knowledge and the sharing of public codified knowledge. Curiously, neither business nor social ties predicted the sharing of private codified knowledge. The results also indicated that closeness of ties is a stronger predictor for sharing of more kinds of knowledge than frequency of interaction.

By using new variable configuration and dichotomies for tie strength and knowledge types, the thesis generated new insights concerning the effects of tie strength on knowledge sharing.

KEY WORDS: Knowledge Management (KM); Knowledge Sharing(KS); Social Networks; Social Network Analysis (SNA); Strength of Ties; Codified Knowledge; Noncodified Knowledge; Public Knowledge; Private Knowledge; Multiple Regression Quadratic Assignment Procedure (MRQAP); Web Survey

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

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CHAPTER ONE

1 INTRODUCTION

1.1 BACKGROUND

> If you have a dollar to spend on knowledge management, it is better spent on connection than capture. (Prusak & Cohen, 2001)

Organizations are becoming increasingly aware of knowledge as ***the*** source rather than ***a*** source for competitive advantage. Drucker (2002) maintained, "The next society will be the knowledge society. Knowledge will be its key resource, and knowledge workers will be the dominant group in its workforce." Researchers and mangers have come to realize that in today's highly competitive environment, knowledge management is the key to organizational success (Leonard & Swap, 2004; Goh, 2002).

Knowledge sharing is one of the main pillars of knowledge management. It is a process through which one unit (e.g., individual, group, department, and division) influences the experience of the other unit through mutual interaction. Inter-unit knowledge sharing has been the subject of a large number of empirical studies. It is recognized that effective inter-unit sharing helps organizations to be more productive and competitive for their sustenance and growth (Argote, Beckman & Epple, 1990; Baum & Ingram, 1998; Darr, Argote & Epple, 1995). It is also understood that knowledge is embedded in, constructed from, and channeled through

social relationships and interactions (Swan et al., 1999; Nonake & Takeuchi, 1995). The highest priority for management is an approach that encourages and fosters relationships among knowledge workers.

Numerous studies have examined how strong informal ties in general are instrumental in the sharing of different kinds of knowledge (Hansen, 2002; Podolny & Baron, 1997; Reagans & McEvily, 2003). Likewise, research on knowledge sharing has focused mainly on the codification of knowledge within particular organizational contexts and how that facilitates or inhibits its sharing (Zander & Kogut, 1995; Hansen, 2002; Reagans & McEvily, 2003).

1.2 STATEMENT OF THE PROBLEM

A great deal of emphasis has been placed on investigating the relationship of tie-strength—using measures of closeness and frequency of interaction--with the sharing of codified/noncodified knowledge. Earlier research has established that closeness and frequency of interactions are instrumental in measuring strength of ties (Hansen, 1999; Reagans & McEvily, 2003). However, it is realized that although closeness of relationships and frequency of interactions are important measures, a fundamental aspect of these ties is related to their orientation—whether these ties are related to business/working relationships or social/informal relationships. Additionally, knowledge sharing research has primarily dealt with codified or noncodified types of knowledge. It is also understood, however, that a more meaningful understanding of knowledge sharing is possible if another characteristic of knowledge—whether the form is private or public—is combined with codified or noncodified types of knowledge. A need exists to study the association between tie-types and knowledge-types by using new configurations: the nature of

the tie (i.e., of business and social ties) can be combined with closeness and frequency measures. Then too, the dichotomizing of knowledge into codified/noncodified can be combined with the categories of public and private knowledge. These multiple categories appear better suited for understanding knowledge sharing in organizations because the "ownership" of knowledge often leads to real problems of knowledge access and hoarding. This research is expected to provide valuable insights and develop new understanding from investigating the associations between these categories of ties and knowledge types that have not yet been investigated.

Another important question worthy of study is whether closeness (as a measure of tie-strength) is a stronger predictor for the sharing of these four types of knowledge as compared with the other measure: frequency of interaction. If these patterns were to be empirically established, they could be expected to extend understanding of these interactions in meaningful ways.

If this research answers questions about the relevance and patterns of these combinations of tie-types and knowledge-types, it would contribute to better understanding of the mythological issues in this area. The objective of this study is to contribute to a better understanding of what sorts of ties matter in sharing which kinds of knowledge under what circumstances. The results may have some implications for clarifying understanding of knowledge sharing behavior in organizations in relation to the prevalent social networks. This might help enterprises in adopting conscious and deliberate organizational strategies for effective sharing of pertinent knowledge across different units. Additionally, if it is established that the closeness of a relationship is a stronger predictor of the sharing of four kinds of knowledge, it might also assist in the further refinement of the measures of tie strength for knowledge sharing research.

1.3 PURPOSE OF THE STUDY

The primary purpose of this research is to determine if the strength of different types of ties is associated with the sharing of different kinds of knowledge. The approach is to use new categories of tie-types and knowledge types that are considered to be more applicable, but not yet been studied. Another purpose is to determine whether or not the dimension of closeness, as compared with frequency of interaction, is a stronger predictor for the sharing of the four kinds of knowledge as defined in this study in an original configuration.

A financial institution has been chosen as the setting of this study because it is recognized as a knowledge-intensive enterprise. IMFC, an international banking institution, was found to be an appropriate site for conducting this study since it is a multi-unit organization in which knowledge is dispersed among different units. In addition, the bank was found to have good performance indicators and that fits with the objectives of this research. This study addressed how twenty-two organizational units at IMFC practice the sharing of public (i.e., codified and noncodified), and private (i.e., codified and noncodified) knowledge in relation to the strength of their business and social unit relationships. In addition, this study investigated whether the closeness of the relationships between different units in IMFC could be a stronger predictor of the sharing of these four kinds of knowledge as compared with the frequency of interaction between those units when measuring strength of ties.

1.4 SIGNIFICANCE OF THE STUDY

This study examined how four types of ties predict the sharing of four types of knowledge. It sought to make a distinct contribution to the available body of research on how social networks

in organizations operate in sharing knowledge. By providing answers to a number of research questions that have not been addressed thus far in the literature, this study provides fresh insights into the investigation of patterns of association and prediction, and to contribute to the empirical methods that seek to illuminate this area.

Moreover, identifying whether the closeness of a relationship is a stronger predictor of the sharing of four kinds of knowledge contributes to the research on measurement of tie strength by offering empirical evidence of what constitutes the better measurement in studies of knowledge sharing, and what implications these two dimensions of strength have on the sharing of the four kinds of knowledge.

The results are equally helpful for both corporate executives and practitioners. Development of knowledge sharing strategies may not be effective unless mangers understand the social relations among different units and how these relations relate to the flow of the knowledge exchange between them. This study enhances their understanding of the nature and differences between business ties and social ties in terms of their association with kinds of knowledge shared. Understanding these associations is crucial for deciding which coordinating strategies best suit and serve the knowledge needs of practitioners. The results may assist organizations in rethinking the ways of approaching certain types of knowledge sharing in their strategic and infrastructural decisions and their application. Organizations might invest in promoting inter-unit exchanges and in creating meaningful social nets for more innovative products and better performance. Their leadership and human resource policies and practices might also receive useful cues from these results.

1.5 ORGANIZATION OF THE STUDY

Chapter One of this study provides the background of the study, states the problem and purpose, and highlights its significance. In the next chapter, the researcher reviews pertinent literature from the areas that have a bearing on the design of this study. Chapter Three lays out the conceptual framework of the study and defines all the terms that have been used in this study for their normative value. Research questions and hypotheses have been developed from the same framework. Assumptions and limitations of the study are explained. A model, provided at the end of Chapter Three, presents the essence of the theoretical basis of the study. Chapter Four describes unique aspects of the SNA method used for defining the research setting, the participants of the study, the design of the instrument, the pilot-testing, the administration of the instrument, and the methods of data organization and storage provides results of the study by illustrating the relevance of Social Network Analysis (SNA) techniques employed and their application for drawing density figures and correlation results. Then regression results are reported for testing the two primary hypotheses and sub-hypotheses of the study. Chapter Six discusses the results of the study and provides some insights about the results that are applicable to the context in which this study has been conducted. A number of specific results have been explained by synthesizing the empirical results with realities grounded in the particular organization. This study closes by proposing possibilities for additional research in this area and making conclusions about the outcomes of this study.

CHAPTER TWO

2 REVIEW OF LITERATURE

2.1 INTRODUCTION

This chapter contains five primary components. It begins with an overview of *knowledge* and its properties. The role of knowledge in modern organizations is examined with special emphasis on the creation of new knowledge, so critical for innovation. Innovative business applications are seldom accidental. Organizations are increasingly recognizing the crucial connection between knowledge and innovation. In many cases, organizations are making the effort and investment to become a self-conscious *learning organization.* A review of the concepts related to learning organizations and their relationship with knowledge applications follows in the next section.

Differences between individual and organizational learning and strategies for developing a learning organization are reviewed. A good understanding of the connection among knowledge, innovation and learning allows organizations to employ their knowledge resources better. Organizations that understand these connections and their potential benefits for the enterprise are those that are undertaking initiatives in knowledge management.

This review of knowledge and its significance in learning organizations leads to an exploration of *knowledge management (KM).* Two approaches to KM, reviewed at the outset of

this section, guide the discussion. Also, the relevance and value of the approach known as *personalization* has gained a great deal of momentum recently among researchers in the field and is surveyed**.**

The fourth section in this chapter deals with *knowledge sharing*, which constitutes the critical element in almost all generic knowledge management models. Studies describing the significance of KS in organizations and among units are discussed. Some *knowledge sharing* frameworks are presented along with explanations of the factors that enable or prevent the sharing of knowledge. Issues related to the nature of the organization --including organizational culture, structure, etc.-- can hinder or facilitate KS. The success or failure of KS is also related to the actors and their motivations to share, as well as their capacities to absorb the knowledge available to them**.**

Subsequently, other elements of the characteristics of knowledge are discussed**.** Such a review is central to the research framework of this study. Factors related to social relationships between actors are examined within an extensive look at social relationships in conjunction with the fifth section which centers on s*ocial networks.* This final section blends a general view of the social network perspective with a description of social capital and its significance, including an explanation of the nature of ties in organizations and their central role in the approach taken in this study. As well, to map relationships and networks in organizations and to explain knowledge sharing in terms of the patterns of these relationships, there is a review of social network analysis (SNA) and how it is used as a tool to illuminate behaviors in relation to the social context in which an actor is embedded. Research on this topic is discussed in addition to the main characteristics of SNA and the focus of SNA studies. This distinguishes between research that focuses on the effects of structural forms as opposed to studies of the relational

characteristics of ties and their effects on certain behaviors in organizations. The chapter concludes with a description of research that describes the effects of these two approaches on knowledge sharing in organizations.

2.2 KNOWLEDGE

During the last decade knowledge has increasingly been recognized as an important component of competitiveness in organizations. Drucker (1993) explored the social purpose of knowledge by dividing its development into three distinct phases. Accordingly, there had been a transition from an industrial economy to a knowledge economy, in which industries applied knowledge to technologies that could make products better and faster. In this phase, "knowledge [was] applied to tools, processes, and products." This changed in the early twentieth century when Taylor began studying the technology of work processes. Drucker maintain that during this phase "knowledge [was] applied to human work." Nowadays, industries, in the third phase, are dependent upon the creation of new knowledge from the previously mentioned *combinative capabilities* of prior knowledge. Now, according to Drucker, "knowledge [is] being applied to knowledge itself." Allee (1997) added another phase to Ducker's three phases and called it "the knowledge evolution." She believed that applying knowledge to knowledge really begins when people reflect on learning and the knowledge component of the work itself and that the importance of learning and knowledge has been clear in this latter phase when organizations as social phenomena are explored.

Organizations need to understand different dimensions of knowledge and the difference between "knowledge" and "information", and why knowledge has become so important if true benefits in the form of timely innovation are to be gained.

2.2.1 Dimensions of Knowledge

There are two ways to gain knowledge:

1. Individuals can themselves gain knowledge through logic and analytical thinking, termed as "know-what." This process is highly individualized, rooted in the Western philosophy of Descartes and has led to the high value traditionally placed on individual achievement and ownership (Cook & Brown, 1999).
2. Individuals can acquire knowledge by interacting with the world around them. In other words, either by observing and talking to people around them or by actually doing "know-how." With this perspective, knowledge can be gained only through interactions one has with the social and physical world (Cook & Brown, 1999). This type of knowledge is action-oriented because it is dynamic and comes from learning and doing instead of resulting from static analytical reasoning.

Organizations as well as schools have always emphasized the first approach of knowledge acquisition and have not valued the later equally. Competition has always been the focus for gaining profits instead of collaboration. Because of the reasons mentioned earlier, more and more organizations are realizing the need to place more value on the second dimension as well to stay competitive.

Nonake & Takeuchi (1995) point out that there is a significant difference between "knowledge" and "knowing". The noun "knowledge" implies that knowledge is a "thing" that

can be located and manipulated as an independent object or stock. It is possible to capture, distribute, measure and manage knowledge. This understanding of knowledge is evident and is reflected in the ways of thinking about knowledge work in many organizations in which knowledge management is seen primarily as a problem of capturing, organizing, and retrieving information, evoking notions of databases, documents, query languages, and data mining. Knowledge is seen as passive, analytic, and atomistic; it is composed of facts that can be stored, retrieved, and disseminated, with little concern for the context in which the facts were originally embedded and little concern for the new and often quite different contexts in which they will be used. In this view, as one widespread advertisement recently claimed, knowledge management is nothing more than getting the right information to the right people at the right time (Thomas, Kellogg & Erickson, 2001). Treating knowledge as an object and using the term interchangeably with information could be misleading and leads to no substantial results in creation and innovation.

The term "knowing" suggests a process, the action of knower and it is inseparable from them (Nonake & Takeuchi, 1995). Knowing is dynamic because it is constantly changing through experience and learning, which leads to the question of how something as fluid in movement and action as knowledge can be managed. Understanding the term "knowledge" and differentiating it from "information" is crucial because it reflects on the ways of thinking of knowledge work and the different approaches adopted by organizations as a result of that thinking.

2.2.1.1 Difference between Information and Knowledge Most people have an intuitive sense that knowledge is broader, deeper and more complex than data or information. **Table 2.1** shows definitions of knowledge, as formulated by different researchers.

Table 2.1 . Definition of Knowledge

Researcher	Definition of knowledge
Allee (1997)	Knowledge is a person's experience gained over time.
Sveiby (1997)	Knowledge is the ability or capacity to act.
Wiig (1993)	Knowledge is a person's beliefs, perspectives, concepts, judgments and expectations, methodologies and know-how. It is a representation of who the individual is.
Choo (1998)	Knowledge is representation of an organization's culture, also known as cultural knowledge.
Nonake & Takeuchi (1995)	Knowledge is the human approach to justifying a personal belief of the truth. Knowledge is created by the flow of information, anchored in the beliefs & the commitment that it holds.
O'Dell & Grayson (1998)	Knowledge is information put into action.
Davenport & Prusak (1998)	Knowledge is a mix of different experiences, values, contextual information & expert insights. Knowledge provides a framework for evaluating and incorporating new experiences & information.

Information, unlike knowledge, is "descriptive and historical, relating primarily to the past and the present" whereas knowledge is "predictive and associative and unveils hidden facts" (Kock & McQueen, 1998). According to Davenport & Prusak (1998), knowledge derives from information, as information derives from data, however, if information is to become knowledge, humans must do all the work. Humans believe that this transformation takes place when the following questions are answered:

- Comparison: how does information about this situation compare to other situations we have known?
- Consequences: what implications does the information have for decisions and actions?
- Connections: how does this bit of information relate to others?

- Conversation: what do other people think about this information?

Mental processing here is the basic ingredient to be applied to information for it to be transformed into knowledge.

Brown & Duguid (2000) propose three distinctions between knowledge and information. The first distinction assumes knowledge to have a possessor, so that its process is intertwined with human activity and experience, while information is independent and in a way self sufficient. The second distinction assumes that knowledge is harder to detach than information. Information is more tangible and self-contained while knowledge is intangible and difficult to transfer. The third distinction is that knowledge is something digested rather than held whereas "information theory" holds information to be independent of meaning.

Stewart (2001) states that knowledge is dynamic because it is constantly changing through experience and learning while information is more static and structured (Southon & Todd, 2001). Davenport & Prusak (1998) argue that the reason knowledge is more valuable than data or information is that it is closer to action. Action means the decisions or movement undertaken as a result of the available knowledge.

The question is whether information and knowledge can be separated by identifying information as something in fixed form like a document or a book, and knowledge as a constantly evolving condition. This distinction could be too simplistic, taking into account how scholars have defined knowledge and information. A good distinction would be the attributes of knowledge, which shifts the focus of knowledge management toward people instead of processes. With the overload of information all around, people do not need more information, but people are needed who can assimilate and understand knowledge and make sense of it (Brown & Duguid, 2000). The importance of people as creators and carriers of knowledge is

forcing organizations to realize that knowledge lies less in the databases developed than in their employees.

Another important distinction between the two is the context. Broadbent (1998) explained that "knowledge is enriched information with insights into its context," revealing how information and knowledge are closely associated, but with the distinction of context. Teece (1998) also shares the same belief in defining knowledge as "information in context". Brown & Duguid (2000) believe that shared practice creates shared context. Context means a wider view, for example, a setting, image, gesture or statement that explains or gives meaning to words, ideas or actions (Cohen, 1998).

The question is why knowledge has become so vital in the organizational life in which the current economy is being defined as knowledge economy (Pinelli et al., 1997; Cross, Parker & Sasson, 2003). This question is addressed in the following section.

2.2.2 Importance of Knowledge

Organizations nowadays are under so much pressure to achieve higher levels of quality and productivity in an intensely competitive market. A major economic shift is taking place that appears to be unrelenting and complex, involving a multiplicity of factors. Duffy (1999) identifies some of these pressures emanating from external forces such as globalization, the need for constant renewal, the accelerated speed of change, intense competition, and customer relationships. Internal forces such as a shortage of resources, increased demands on existing employees, and changes in technology bear additional strains on the demand and availability of information and knowledge, having an impact on all organizations, whether large or small.

As companies move forward, they must negotiate difficult paths between serving existing markets, and developing new initiatives to meet the challenges of new competitors and opportunities. The key to negotiating between these opposing forces successfully is knowledge, specifically the knowledge assets each firm holds within (Housel & Bell, 2001).

Hayek (1996) was among the first economists to recognize the importance of a well-functioning economy of knowledge and its distribution. He argued that most economists had misunderstood the nature of the economic problem. In his diagnostic stance, "the economic problem of society . . . is not merely a problem of how to allocate given resources . . . it is a problem of the utilization of knowledge which is not given to anyone in its totality."

Organizations are becoming increasingly aware of knowledge as the source for competitive advantage because of the following reasons:

1. Drucker (2002) observed that by 2030, people over sixty-five in Germany, the world's third largest economy, will account for half of the adult population, while the population of those under thirty-five will shrink about twice as fast as the older population will grow. These figures are similar to those in several developing countries as well. This implies that more people will be retiring soon with not enough workers of the next generation of workers to replace them and contribute to their retirement incomes through payroll taxes.
2. There is an overload of information caused by technological advancements. Drucker (2002) believes an organization can no longer depend on information alone for competitive advantage because information travels incredibly fast and does not remain a unique resource. Also, it takes more time and effort to sort through this abundance, analyze it, and use it for decision-making or problem solving. Therefore, Drucker calls

for new approaches for managing both the change and the organization by managing the knowledge of the organization.

3. Global competition is a major factor in placing more value on time. Timely innovation is the key factor to success in the markets now.

2.2.3 Innovation

An organization that wants to succeed in today's tough business climate must innovate to stay competitive. Duffy (1999) defines innovation as "the creation, evolution, exchange, and application of new ideas into marketable goods and services for the excellence of an enterprise, the vitality of a nation's economy and the advancement of society as a whole."

Innovation depends on the individual and collective expertise of employees. The great capacity of the human mind to make sense of life's experiences and mistakes and connect these with the present is very impressive and hard to capture. Therefore, interactions with others are essential in the innovation process (Leonard & Sensiper, 1998). An individual's knowledge is important, but it serves as a base for innovation because it has to be shared and merged with the knowledge of others for innovation to take place. Collective tacit knowledge (i.e., noncodified knowledge) is developed over time in interactions among individuals in the group. Studies of innovative people refer, most of the time, to their interactions with others as a major element in this process. In one of those studies, a participant commented "It's only by interacting with other people in the building that you get anything interesting done"; another commented "I develop a lot of my ideas through dialogue" (Czikszentmthalyi & Sawyer, 1995).

Innovation relies on knowledge and learning. Innovative business applications are not accidental. Often the conditions that foster new innovative thinking are carefully planned and

put into place. In a demanding business environment, most business leaders recognize the value for the corporation of developing a "learning organization."

2.3 LEARNING ORGANIZATION

Huber (1991), a leading theorist in organizational learning, states that an entity learns if the range of its potential behavior is changed through the processing of information. Nevis, DiBella & Gould (1995) describe an organizational learning process that links learning explicitly to organizational knowledge. -These authors propose three stages of learning:

- Acquisition: the development or creation of skills, insights and relationships;
- Dissemination: the sharing and disseminating of what has been learned;
- Utilization: integrating knowledge so that it is broadly available and can be generalized to new situations.

Nevis et al. (1995) maintain that learning does not always occur in linear fashion as mentioned in the previous three stages; rather, it can take place through socializing and utilization. An organization, for the sake of its own future, is wise to encourage learning as an ongoing activity. Senge (1992), who popularized learning organization with his best seller book, *The Fifth Discipline*, describes the learning organization as a place where "people continually expand their capacity to create the results they desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning how to learn together." Garvin (1997) describes it as an "organization skilled at creating, acquiring, and transforming knowledge, and at modifying its behavior to reflect new knowledge and insights.

2.3.1 Individual and Organizational Learning

The recent emphasis on learning has sparked major investment in training and education (Duffy, 1999). Huysman & DeWit (2002) believe that these are tools that support individual learning instead of collective learning. They believe that much of the collective knowledge is gained during interactions and the real value of these training sessions could be only in the opportunity provided for participants to establish networks and learn from each other. Duffy (1999) states that it cannot be assumed that an increase in individual learning automatically leads to an increase in organizational learning. These authors think that, for knowledge to be efficiently transferred across the organization, attention should be given to how groups might learn from one another and how this will facilitate continuous improvement.

2.3.2 Building a Learning Organization

Smith & Kelly (1997) assert that organizations that can develop methods for increasing the need for and impact of learning will clearly have a competitive edge. Garvin (1997) states that before people and organizations can improve, they must learn. He identifies three issues that must be addressed before an organization can truly become a learning organization. These issues are:

- Meaning: a well-grounded, easy-to-apply definition of a learning organization;
- Management: clear operational guidelines for practice; and,
- Measurement: better tools to assess the organization's level of learning.

Using these three Ms as a framework, Garvin (1997) defines learning organizations as those that are skilled in five main activities: (1) systematic problem solving; (2) experimentations with new ideas; (3) learning from past experience; (4) learning from the best practices of others, and (5) transferring knowledge quickly and efficiently throughout the organization. He asserts that no

learning organization is built overnight. Success, in his opinion, comes from carefully cultivating attitudes, commitments, and management processes that accrue steadily.

The concepts of a "learning organization" differs from the concepts and ideas regarding the process of "organizational learning," which is a basic element in the evolution of organizations. Every organization learns, regardless of how it operates or whether or not this learning will result in the organization's improvement (Romme & Dellen, 1997). Various authors have argued that there is a growing dichotomy between these two streams of research: the learning organization stream and the organizational learning stream (Easterby-Smith, Araujo & Burgoyne, 1999; Tsang, 1997). These two streams represent two contrasting and distinct perspectives, as shown in the following table:

Table 2.2 : Difference between Organizational Learning and the Learning Organization

	Organizational Learning	**Learning Organization**
Outcome potential	Organizational change	Organizational improvement
Motive	Descriptive	Prescriptive
Objectives of writing	Theory building	Intervention
Stimulus	Emergent	Planned
Target audience	Academic	Practice
Scientific background	Decision theory; Organizational studies	Organizational development, strategic management

Source: (Huysman & DeWit, 2002)

Understanding the connection among knowledge, innovation and learning allows organizations to capitalize on their knowledge resources more effectively. Organizations that understand these connections invest in knowledge management for enterprise benefits.

2.4 KNOWLEDGE MANAGEMENT (KM)

Knowledge management (KM) is a broad concept that can be interpreted in many different ways. Quintas, Lefrere & Jones (1997) defined knowledge management as "the process of continually managing knowledge of all kinds to meet existing and emerging needs, to identify and exploit existing and acquired knowledge assets and to develop new opportunities." Wiig (1997) defined the term: "Knowledge management is the systematic, explicit, and deliberate building, renewal and application of knowledge to maximize an enterprise's knowledge related effectiveness and returns from its knowledge assets."

O'Dell & Grayson (1998) state that KM is a conscious strategy of getting the right knowledge to the right people at the right time so they can take action and create value. One viewpoint about KM is about controlling and channeling knowledge flows within an organization, assuming that all knowledge can be codified. Others interpret KM as the act of making knowledge accessible to professionals throughout the organization. What is often overlooked is that KM is a holistic concept that integrates knowledge, people, processes, strategies, and technologies (Huysman & DeWit, 2002).

Two major and distinctive approaches to knowledge management were identified in the KM literature, codification and personalization. These two approaches are reviewed in the following sections.

2.4.1 The Codification Approach

The codification approach is intended to collect, codify, and disseminate knowledge, primarily through a heavy emphasis on information technology (IT). Davenport & Prusak (1998) explained that the aim of codification is to place organizational knowledge into a form that

makes it accessible to those who need it. In their view, this means literally turning knowledge into a code to make it as organized, explicit, portable, and easy to understand as possible. Hansen, Nohria & Tierney (1999) described this approach as a strategy that centers around the use of computer. They maintained that knowledge is codified and stored in databases where it can be accessed and used easily by anyone in the company. Knowledge is codified using a people-to-documents approach, as it is extracted from the person who developed it, made independent of that person, and reused for various purposes.

Wick (2000) presented two additional approaches. The document-centered approach places emphasis on extracting knowledge from individuals and then analyzing, synthesizing, and developing it into documents. This technological approach employs multitudes of systems such as Intranets, portals, data mining, and high-powered search engines that facilitate dissemination and application of knowledge. Swan et al. (1999) identified the cognitive network as a model for "exploitation" knowledge, in which existing knowledge is captured, transferred and deployed in other similar situations. Information systems in this model play a crucial role and are a critical success factor. The dominant metaphors in this model, the authors believe, are the human memory and the jigsaw, which is the fitting pieces of knowledge together to produce a bigger picture in predictable ways.

2.4.2 Arguments against the Codification Approach

Going through the literature on KM, especially during the late 1990s, an overwhelming emphasis on IT is found but with major gaps in the treatment of people. This approach comes from the particular definition of knowledge in which the emphasis is on knowledge as a *thing* rather than as a dynamic *process*. Many practitioners have adopted the codification approach that focuses

on information processing as an input/output system. According to this perspective, information and knowledge are codifiable and, once codified, subject to analysis and manipulation of almost infinite complexity. Thus, knowledge management is reduced to effective knowledge elicitation and an efficient user requirement. This emphasis was clearly evident in the early literature of KM. A number of cases cited in the literature were found in which information systems failed to codify tacit knowledge. The primary reason is that these systems did not interpret knowledge as a process in the design of the systems. It is in the transmitting of tacit knowledge that, typically, more of value to the innovation process is found (Grant, 1996).

Gardner (1998) believes that tacit knowledge may not lend itself to capture via the use of IT networks because it may be too difficult to explain, too uncertain, considered unimportant to anyone else, too changeable, too contextually specific or too politically sensitive. Butler (2003) presented empirical evidence supporting these theoretical claims that information systems do not and cannot codify tacit knowledge. He tracked an IT company as it tried to commercialize its CBR (case-based reasoning) technology in three distinct applications for different clients. The three cases represent a total failure, a complete success, and an intermediate outcome. All three converge on the idea that complex tacit knowledge and thought processes do not lend themselves to engineering approaches. As Butler (2003) points out, information systems may reconstruct only highly attenuated versions of the knowledge intrinsic to people, or what he called "knowledge-informing data." He concludes that practitioners' understanding of knowledge was perceived to be deficient. IT professionals admitted that the applications they developed did capture~~d~~ and deliver data, not knowledge, and that such data had to be interpreted by committed end-users to convert it to become useful knowledge.

Bansler & Havn (2003) presented the story of a global pharmaceuticals company that tried to promote the sharing of best practices through an Intranet-based application. After two and a half years of continuous efforts to make it work, the company abandoned the project because its intended users simply ignored it. The authors demonstrated five non-technical reasons for the system abandonment. This and other cases (Mylonopoulos & Tsoukas, 2003) indicate that a focus was creating a technological infrastructure without encouraging active, personal networking could have a negative, rather than a positive, impact on knowledge sharing projects. The afore-cited cases of failure of technological systems have shifted the attention of researchers more to the personalization approach.

2.4.3 The Personalization Approach

This approach focuses on developing networks for linking people so that tacit knowledge can be shared. Hansen, Nohria & Tierney (1999) defined it as the knowledge that has not been codified—and probably it cannot be—but is transferred in brainstorming sessions and one-to-one conversations. Many organizations have come to realize that it is not advisable to focus only on capturing knowledge, as much of the knowledge required in many organization is highly dynamic and may quickly become obsolete or inaccurate. Weiss (1999) demonstrated this by giving an example of how, in professional service firms, knowledge concerning a client's business may erode quickly as strategic objectives or market conditions change, new products and services are developed or internal reorganization is implemented. This approach focuses on dialogue between individuals. Wick (2000) calls this approach the "socio-organizational knowledge management." He states that this approach emphasizes interactions between people. Its highest priority is nurturing a knowledge sharing culture by encouraging and fostering

relationships between knowledge workers for the sake of innovation and the generation of new knowledge.

Knowledge sharing has been one of the critical elements in almost all the generic knowledge management models, though different labels have been used to identify the process.

2.5 KNOWLEDGE SHARING

Knowledge sharing has received ~~a~~ major attention because it is one of the primary pillars in KM efforts (Lee & Al-Hawamdeh, 2002). Perhaps more organizations are now addressing more the issue of knowledge sharing more because of their growing awareness of the importance of knowledge to organizational success. Hendriks (1999) notes that the relevance of this theme derives from its providing a link between the level of the individual knowledge workers, in whom knowledge resides, and the level of the organization, where knowledge attains its economic and competitive value.

Lee & Al-Hawamdeh (2002) have defined knowledge sharing as the "deliberate act in which knowledge is made reusable for one party through its transfer by another." They state that knowledge sharing is a process taking place between two actors, and the process may involve one or more people. It may take place between two people in a one-to-one relationship such as a conversation over a cup of coffee. Or it may be a one-to-many interaction such as in a meeting or a presentation. Argote et al. (2000) define knowledge sharing as "the process through which one unit (individual, group, department, division) is affected by the experience of the other."

2.5.1 Significance of Knowledge Sharing in Organizations

The realization that tacit 'noncodified knowledge' is of more value than explicit 'codified' knowledge to the innovation process (Grant, 1996; Leonard & Sensiper, 1998) has shifted attention to knowledge sharing within organizations, as tacit noncodified knowledge cannot be communicated, understood, or used without the 'knowing subject' (Nonaka, 1994). This emphasis on tacit noncodified knowing as the origin of human knowledge has also directed attention to the social and interactive nature of learning.

Knowledge sharing is important in organizations as it prevents the "reinvention of the wheel" (i.e., the redundancy in knowledge production leading to costly duplications) ensures the speed of best practices, and makes available private knowledge in the problem-solving or decision-making process (Duffy, 1999). Both practitioners and researchers have discussed the importance of knowledge sharing within an organization (Govindarajan & Fisher, 1990; Kogut & Zander, 1992; Zander & Kogut, 1995). Knowledge sharing leads to a synergistic cost advantage, providing a shared resource at a lower cost than if different parts of the organization had separately produced or created the same product (Gupta & Govindarajan, 1986; Porter, 1987). Moreover, knowledge sharing allows employees to obtain more complete knowledge and information and to be able to make better informed decisions (Gynawali, Stewert & Grant, 1997).

2.5.2 Significance of Knowledge Sharing Among Units

In multiunit organizations, units can learn from each other and benefit from new knowledge developed by other units. Knowledge sharing among units provides opportunities for mutual learning and inter-unit cooperation, which stimulates the creation of new knowledge (Tsai &

Ghoshal, 1998). A growing body of empirical evidence indicates that organizations that are able to share knowledge effectively between one unit and another are more productive and more likely to survive than organizations that are less adept at knowledge sharing (Darr, Argote & Epple, 1995; Baum & Ingram, 1998).

2.5.3 Knowledge Sharing Frameworks

Hendriks (1999) believes that knowledge is not a commodity that can be passed around freely; it is tied to a knowing subject. He states that knowledge sharing presumes a relation between at least two parties, one that possesses knowledge and the other that acquires knowledge. The first party should communicate his knowledge and the other should be able to receive this knowledge and make sense of it.

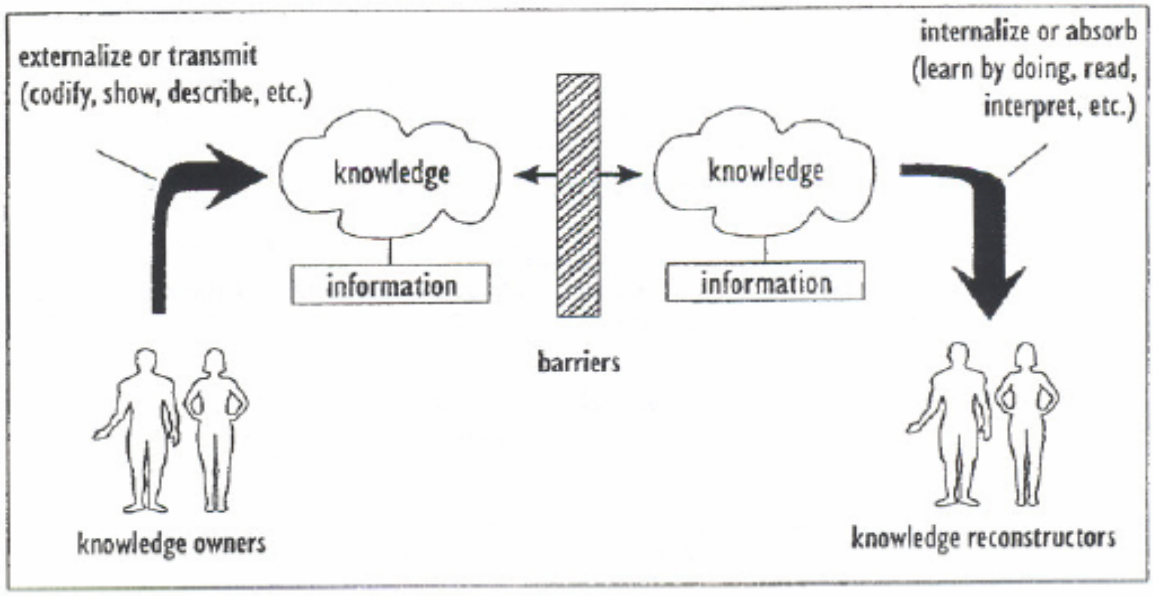

Figure 2.1 A Simplified Model of Knowledge s Sharing (Hendriks, 1999)

In their study of eight U.K. companies in the manufacturing, chemical, aerospace, automobile and defense industries, Yeung & Holden (2000) developed a model of knowledge sharing for achieving effective knowledge reuse within industrial organizations. Reuse is desirable in such organizations because it reduces risk and enhances productivity and effectiveness. Their model consists of these five stages of adoption, adaptation, absorption, integration, and dissemination, which are supported by the four pillars of organizational infrastructure, actor, technological enabler, and sharing channel.

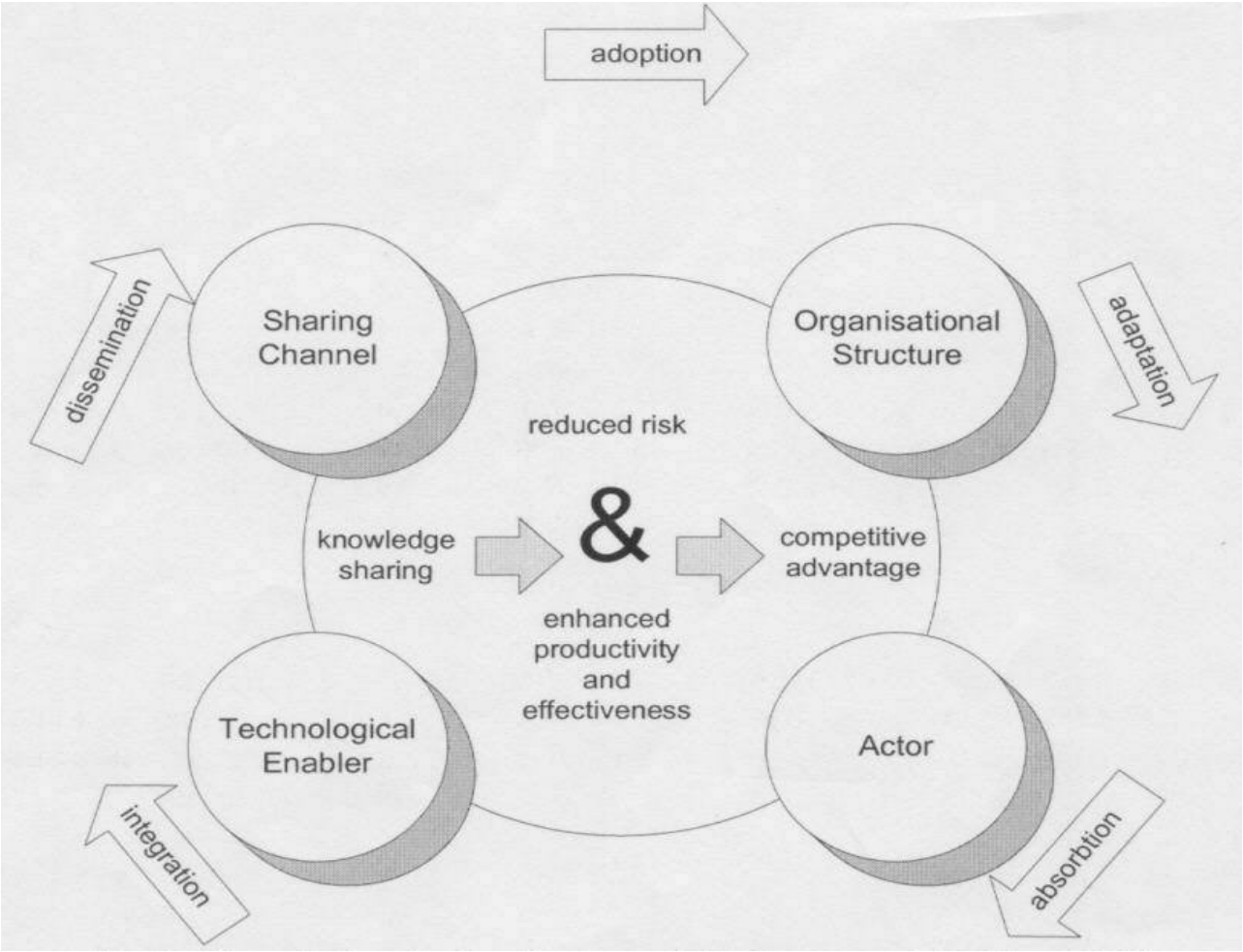

Figure 2.2 Knowledge Sharing Framework (Yeung & Holden, 2000)

In *adoption*, the recipient scans the environment to locate relevant knowledge. The recipient's background knowledge is expected to help him be aware of what, where, and who to look for. *Adaptation* is a cognitive process in which the user eliminates uncertainty, fuzziness, and internal contradictions to fit the context at hand. In the *absorption* stage, the user gains experience and competence in using the knowledge, commits to it, and internalizes it. In *Integration*, knowledge is combined in a new whole and the recipient is said to have mastered the art of the craft. Finally, in *dissemination*, knowledge is made available to the organization at large through various mechanisms.

The *sharing channel* is the media and modes of communication used to share knowledge. *Technology* is a critical enabler because it allows organizational members, who could be geographically collocated or dispersed, to communicate either synchronously or asynchronously. The tools should enable the discovery, filtering and storage of knowledge, facilitate collaboration, and allow enterprise-wide access to knowledge repositories. Actors are the human participants who affect the motivation for knowledge sharing and learning (Yeung & Holden, 2000).

Szulanski (1996) proposed a framework to address knowledge sharing in organizations. The framework focuses on the difficulties of sharing knowledge of best practices within an organization. According to this framework, there are four stages to knowledge sharing: initiation, implementation, ramp-up, and integration. The initiation stage encompasses all events leading to the sharing of knowledge. The reorganization of a gap and need in one area of knowledge motivates one to search for a solution to fill the need. The search for various knowledge sharing processes begins either when a need is met or a solution is found. The implementation stage is the recognition that knowledge sharing is a necessary process. At the implementation stage,

knowledge is exchanged between the recipient and the source. The implementation stage stops when the shared knowledge is utilized and the ramp-up stage begins. In the ramp-up stage, the recipient identifies and resolves unexpected problems encountered with the use of new knowledge. In the integration stage, the shared knowledge is documented and adopted as a standard in the organization when accepted as a solution.

2.5.4 Factors Contributing to Hoarding or Sharing of Knowledge

Lee & Al-Hawamdeh (2002) identified several barriers to knowledge sharing and developed a model that attributed these barriers to five different sources in the knowledge sharing process--the actors, the channel, the knowledge being shared, the organization, and the environment.

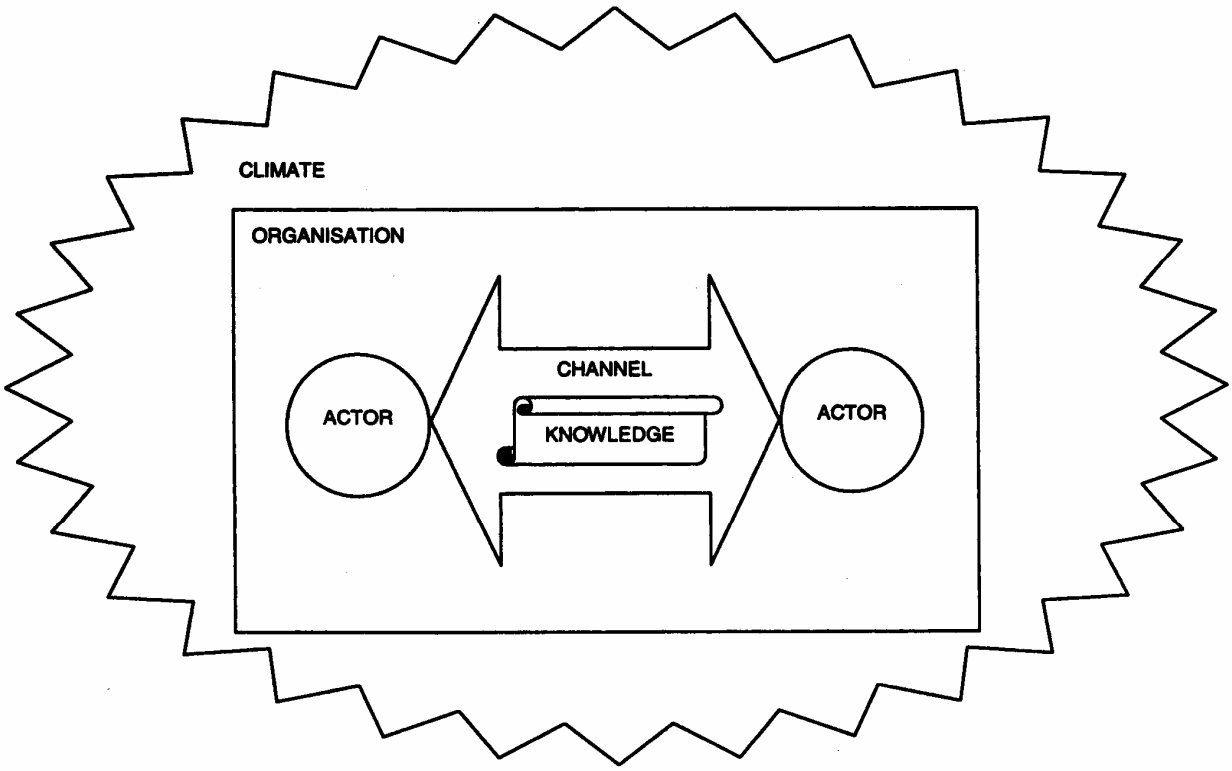

Figure 2.3 Knowledge Sharing Framework (Lee & Al-Hawamdeh, 2002)

2.5.4.1 Factors Related to Organization

2.5.4.1.1 Organizational Culture Organizational culture is believed to be a significant contributing factor to effective knowledge management and knowledge sharing. –This culture determines values, beliefs, and work systems that could encourage or impede knowledge sharing and creation (Alavi & Leidner, 1999; Gold, Malhotra & Segars, 2001). Research on knowledge management initiatives has shown that knowledge and culture are linked in organizations (Brown & Duguid, 1991). Long & Fahey (2000) explain why a culture influences the creation, sharing and use of knowledge. They believe that culture shapes perceptions and behaviors. The authors state that cultures--and particularly subcultures--heavily influence what is perceived as useful, important or valid knowledge in an organization. Different perceptions of what knowledge is important may eventually lead to conflict among individuals and units. Secondly, they explain how culture dictates what knowledge belongs to the organization and what knowledge remains in control of the individuals or sub-units. They explain this point by giving an example of a senior manager asking his employee to "show me something I've never seen before" instead of "show me where you've worked together with another business unit." Thirdly, they assert that culture creates a context for social interaction that ultimately determines how effective an organization can be at creating, sharing and applying knowledge. Lastly, they mention how culture shapes the process by which new organizational knowledge together with its accompanying uncertainties is created, legitimated and shared.

Buckman Labs, an International corporation producing over 500 different products and employing over 1,300 people in over 70 countries is a leading manufacturer of specialty chemicals for aqueous industrial systems. The company was founded on its unique ability to create and manufacture innovative solutions to control the growth of microorganisms.

Buckman Labs has gained prominence for its knowledge sharing culture. For seven straight years, it has been recognized as one of the world's most admired knowledge enterprises (MAKE, 2004). Fulmer (1999) explains that the company's code of ethics is one of the most important elements in their success in knowledge sharing and has been absolutely crucial in creating a culture of trust in which knowledge can move to wherever it is needed at any point in time. At Buckman Labs, in the early 1980s, all associates were involved in the creation of a values statement and code of ethics. These were the common values derived from the process (O'Dell & Grayson, 1998):

1. The organization is composed of unique individuals with different capabilities, all necessary to successful operation of the company.
2. Individuality will be acknowledged by treating one another with dignity and respect and maintaining the focus on continuous and positive communication among all employees.
3. The contributions and accomplishments of all employees will be recognized irrespective of magnitude.

These statements are accepted as company values to this day. A complete version of the code is available in Fulmer (1999).

Deeply ingrained beliefs and values at 3M, a manufacturing company that specializes in pressure-sensitive tape, reflective material, video and audiotape, laser imaging equipment and health care products, have also encouraged knowledge sharing. Tolerating creative mistakes, respecting individual talents and delegating responsibility at all levels of the firm have been made part of the company's culture. Fifteen percent of a researcher's time is expected to be spent on personal research interests. All are eligible to apply for grants to support their research, and researchers are encouraged to involve other employees in their projects.

Trust, collaboration and care are all perceived as main elements of an organization's knowledge sharing culture.

2.5.4.1.1.1 Trust *Trust* is the most commonly cited value that is linked with knowledge sharing. The level of trust that exists in an organization, its subunits, and its employees greatly influences the sharing of knowledge among these different levels. Abrams et al. (2003) found that trust leads to effective knowledge sharing, but distinguishes between two kinds of trust. First, there is a benevolence-based form in which an individual will not intentionally harm another when given the opportunity to do so. Second, there is a competence-based trust in which an individual believes that another person is knowledgeable about a given subject area. According to the research conducted by IBM of 138 people in three companies, a competence-based trust was found to have a major impact on knowledge sharing, involving highly tacit knowledge. Benevolence-based trust was found to be significant in sharing both explicit and tacit knowledge. Huener, Von Krogh & Roose (1998) regard the level of trust in the organization as the most important factor determining the willingness to share knowledge. McEvily, Peronne & Zaheer (2003) argue that the level of trust influences the extent of knowledge disclosure, as well as the screening and sharing between two parties. Trust, in their opinion, reduces apprehension about the veracity of knowledge, thereby diminishing the tendency to question the accuracy of the knowledge received.

2.5.4.1.1.2 Collaboration *Cooperative* norms and *collaboration* have also been strongly linked to knowledge sharing. Willingness to assist others is relevant because knowledge sharing is typically beneficial to the recipient and the broader organization, but can be costly for the source who has to devote time and effort to communicating what he knows. The source's

willingness to share knowledge, despite these costs, represents cooperative behavior, which is likely to occur when strong third party ties surround a relationship (Granovetter, 1985). Cooperative norms provide a senders of knowledge with some assurance that if he shares knowledge with somebody today, someone else will be willing to do the same for him in the future. Cooperative norms increase the knowledge sender's confidence that someone will be willing to assist him when finds himself in a similar situation, even if it is not in that person's short-term interest to do so (Uzzi, 1997). Cooperative norms are important because these limit a potential side effect of successful knowledge sharing, namely, competition. Intense competition among different units inside an organization restricts the sharing of knowledge among them (Szulanski, 1996; Argote, 1999).

Competition can have the same effect on knowledge sharing between individuals. Successful knowledge sharing can increase the level of competition between the source and the recipient. When an individual shares what he or she knows with a colleague, the two individuals now have more knowledge in common and therefore represent substitutable points of exchange in the organization. The potential for increased competition is one reason why people avoid sharing what they know. The cooperative norms can act to mitigate potential conflict and promote knowledge sharing (Ingram & Roberts, 2000). A study of three large professional service firms by several management theorists showed that their success in their respective industries is due to a factor common among the trio, which is an ethic of collaboration. This ethic brings the advantages of scale to the concept of teamwork. It replicates the attitudes and activities of sharing and creating knowledge evident in high performance teams on an institutional scale (Haskins, Liedtka & Rosenblum, 1998).

Collaboration and trust are linked together as reported by Tschannen-Moran (2001). He found the evidence that the level of collaboration in schools is related to the level of trust. Sveiby & Simons (2002) believe that a collaborative climate is the bandwidth of human infrastructure for knowledge sharing. Willingness to share and open communication are the norms in the interactions between the employees and their bosses, employees and their work group, employees' own attitude and the norms throughout the organization.

2.5.4.1.1.3 Care Von Krogh (1998) explained that at the level of the individual, knowledge creation is unproblematic as it involves making sense out of a new situation by justifying it against one's observation of the world, using one's own unique viewpoint, personal sense making, and individual experience. However, knowledge creation in a social context is more difficult as it starts with the sharing of tacit knowledge to create concepts. This hinges on the ability of the individual to share their personal true beliefs about a situation in the presence of other team members. Justification, in this case, is public, and takes the form of knowledge sharing. He stressed the need to make knowledge sharing less fragile by fostering the enabling condition of care in organizational relationships, which gives rise to trust, active empathy, access to help, lenience in judgment, and courage. In dwelling, which is important in the sharing of tacit knowledge, is only possible when there is a high level of care. In a supportive environment, colleagues show interest and dwell in each other's experience, perspectives, and concepts. It is where 'looking at' becomes 'looking with.' This makes it easier for individuals to spontaneously articulate knowledge while learning. Unconventional language can be used, reasons behind good or bad performance can be revealed, and the emotional aspect of an experience can be expressed. Nevertheless, it needs to be understood that not all authors and scholars believe that a collaborative culture is the key to effective knowledge sharing. Dixon (2000) does not believe

that exchange of knowledge happens only in organizations that have a collaborative culture and considers it a myth. She assumes that when people begin sharing ideas about issues they consider important, the sharing itself creates a learning culture. McDermott & O'Dell (2001) observed that companies did not change their culture to match their knowledge management initiative, but adapted their approach to knowledge management to fit their culture. They found that companies accomplished that by linking sharing knowledge to solving practical business problems; tying sharing knowledge to existing core values; introducing knowledge management in a way that matches an organization's style; building on existing networks people use in their daily work; and, encouraging peers and supervisors to exert pressure to share.

2.5.4.1.2 Organizational Structure Another important factor in knowledge sharing is an appropriate organizational structure. *Knowledge-based theory* sees the firm as a body of knowledge residing in its structures of coordination, which in turn, defines the social context for cooperation, communication and learning (Nelson & Winter, 1982; Kogut & Zander, 1992). At the heart of this theory is the idea that the primary role of the firm and the essence of organizational capability are the integration and creation of knowledge (Grant, 1996). Differences in the organizing principles of firms thus reflect the differences in knowledge base and learning capabilities. Given that diverse knowledge is embedded in different units, the way the firm coordinates different units significantly affects the pattern of intra-organizational knowledge sharing. A hierarchical structure of internal organization is primarily built upon centralization of authority where coordination is achieved through vertically imposed bureaucratic processes. Centralization determines whether the locus of decision-making authority lies in the higher or lower levels of hierarchical relationship. On one hand, Grant (1996) argued "once organizations are viewed as institutions for integrating knowledge, a major

part of which is tacit and can be exercised by those who posses it, then hierarchal coordination fails." Tsai (2001) used sociometric techniques for analyzing the effect of centralization on knowledge sharing and found out that formal hierarchal structure in the form of centralization had a significant negative effect on knowledge sharing. On the other hand, from an information processing perspective, centralization is likely to have a positive effect on intra-firm knowledge sharing because "centralization provides coordination and integration across the interdependency" (Egelhoff, 1982). Centralized systems are alleged to facilitate communication flow via their extensive monitoring and reporting requirements (Bennett & Gabriel, 1999).

Grant (1996) emphasized the importance of team-based structure as an essential characteristic of organizational structures, pertinent to value creation through knowledge utilization. Team-oriented work environments provide opportunities for employees to learn from colleagues with expertise who are supportive and willing to help one another through working together, sharing information and knowledge, and watching out for one another (Mikkelsen, Ogaard & Lovrich, 2000). Teams use a communication channel for knowledge seekers and knowledge senders to exchange in knowledge markets and this exchange behavior in turn leads to superior performance (Guzzo & Dickson, 1996).

2.5.4.1.3 Reward System Rewards and incentives are important components of the knowledge management process. Garvin (1997) stressed that changes in the performance, incentives, and measurement systems are essential to create a culture in which knowledge sharing is the norm. In nutshell, this literature indicates that reward systems express and reinforce the values and norms of the organization. According to Kerr & Slocum (1987), reward systems are in effect powerful mechanisms that can be used by managers to communicate

desired attitudes and behaviors to organization members. However, a reward system should be implemented with care in order to facilitate knowledge sharing.

Members of a unit are unlikely to share knowledge with other parts of the organization if they are not rewarded for utilizing internal knowledge. Social rewards can be just as important as monetary rewards (Menon & Pfeffer, 2003). Developing a reward system that will encourage knowledge sharing is very essential. A system that addresses the question of fairness when knowledge is shared or given up and carries a powerful message for representing an organization's approach to knowledge sharing and knowledge management will essentially encourage knowledge sharing (Esquibel, Ning & Sugg, 1990) The concept of knowledge sharing in exchange for some type of compensation is a radical departure from the traditional practice and belief that employees belong to the organization and by association their knowledge belongs as well.

Pffefer (1998) noted that reward system influences the sharing of knowledge within organizations. Rewards are more than a payment by an organization to an individual. They are an exchange. The organization is looking for certain kind of behavior and the employee, in exchange for this commitment, expects certain rewards (Kerr & Slocum, 1987). According to Beer & Spector (1981), monetary compensation makes up only a part, and not always the most significant part, of those rewards. Promotion, fringe benefits and bonuses as well as more personal rewards of recognition and self-esteem are all critical parts of the exchange that must make up the reward system of any organization. Often, traditional incentive systems have an adverse effect on the willingness to share knowledge by encouraging individualism and extreme forms of competitiveness (Esquibel, Ning & Sugg, 1990). Yahya & Goh (2002) explained that the design of a compensation and reward system should be built on promoting group

performance, knowledge sharing, and innovative thinking. They believe that performance appraisal must also be the basis of evaluation of employees' knowledge management practices. Davenport & Prusak (1998) noted that companies that were most successful in knowledge sharing had both formal and informal reward systems that provided recognition, status, and even material rewards to those who shared expertise and helped others, and not to those who developed and maintained knowledge monopolies.

2.5.4.1.4 Technology While the adage is that knowledge management is 10% technology and 90% people (Zack, 1999), many researchers and organizations are preoccupied with structured forms of knowledge sharing with a bias toward technology. Huysman & DeWit (2002) have noted that many knowledge management projects had their origin in the information and communication technology (ICT) world. Organizations believe that with the rise of advanced technology, opportunities to facilitate knowledge sharing with organizations are on the increase. Frappaolo & Capshaw (1999) noted that the key applications of KM projects are based on a framework that positions knowledge management's primary role as the connection of knowledge throughout the organization among different entities. In each case, the focus is on ensuring that each individual or group understands the knowledge available with sufficient depth as to be applied effectively in decision-making and innovation. The four functions performed by KM systems are:

1. Intermediation: Refers to the connection of people to people, e.g. videoconferencing.
2. Externalization: Refers to the connection of one information source to another information source, focusing on explicit knowledge, providing a means to capture this knowledge in a knowledge repository and to organize the knowledge according to some classification framework or ontology.

3. Internalization: Refers to the connection of explicit knowledge to people or knowledge seekers, involving extraction of knowledge from external repositories and subsequent filtering. An example of that is the deductive databases that help users find acceptable solutions to problems (Basu, 1998).

4. Cognition: Refers to connecting knowledge to process, a function of systems to make decisions based on available knowledge. For example, expert systems help users in deducing solutions (Basu, 1998).

Developments in ICT have played a vital role in providing the infrastructure needed to support knowledge sharing within and between organizations. The media and channels of communication assist in the creation, storage and sharing of knowledge, but are not the only resources required. Arguably, socio-organizational elements have the most significant bearing on knowledge sharing. Swan et al. (1999) conducted a study comparing two cases. One of them focused almost entirely on using IT (intranet) for knowledge sharing, resulting in a plethora of independent intranets which reinforced existing organizational and social boundaries with electronic fences. In the other company, IT was used to provide a network to encourage sharing together with the recognition of the importance of face-to-face interaction for sharing tacit knowledge. The emphasis was on encouraging active network among dispersed communities. According to this company's view, knowledge cannot be simply processed; rather it must be continuously re-created through dynamic, interactive social networking activity.

Mylonopoulos & Tsoukas (2003) believe that ICT enables data processing on a large scale, crossing the boundaries of time and space. But, they also believe that organizational action cannot be anything but social. Therefore, any technology-driven intervention aimed at supporting knowledge sharing needs to be aligned with the social and organizational mechanisms

of knowledge sharing. The long history of ICT project failures is full of lessons that sound system design goes hand in hand with organizational transformation and effective leadership.

Too heavy a bias toward ICT manifests itself in the following three myths: (1) new technological opportunities improve organizations, (2) everyone is capable of using ICT applications, and (3) knowledge can be stored in systems (Huysman & DeWit, 2002).

2.5.4.2 Factors Related to Actors

2.5.4.2.1 Motivation Even if the organization provides all conditions necessary for the sharing of knowledge, a lack of motivation for different reasons, both in the recipient and the source of knowledge, could play a crucial role in inhibiting knowledge sharing. Several reasons were mentioned for lack of motivation: Herzberg (1987) motivation theory distinguishes between motivation factors and maintenance or hygiene factors. He identifies salary, working conditions, status and interpersonal relations as hygiene factors. He considers the challenge of work, promotional opportunities, and sense of achievement and recognition as motivational factors.

Hendriks (1999) believes that the quantity of knowledge sharing may perhaps be enhanced with money, but its quality cannot. He thinks that hygiene factors may frustrate knowledge sharing, when absent, but it is unlikely that they will enhance knowledge sharing. People, in his opinion, share knowledge as they expect recognition and appreciation of their knowledge, promotional opportunities or have a sense of responsibility. Hendriks (1999) also states that reciprocity is a strong motivational factor, as people share their knowledge because they expect or hope that others too will share their knowledge that may be useful to them on another occasion. On the other hand, other researchers like Szulanski (1996) found very weak link

between motivation and knowledge sharing in his study of the factors affecting knowledge sharing. He found cognitive and relational factors to be more important. Hinds & Pfeffer (2001) highlighted deep-rooted cognitive and motivational limitations that interfere with an expert's ability to share their knowledge with novices. From the motivational perspective, knowledge sharing runs counter to the structure and operating premises of most organizations, which are designed to foster internal competition between employees. This is exacerbated by incentives determined by performance judged relative to the performance of others, as opposed to performance judged against an absolute metric, resulting in a zero-sum situation. A voluntary request for knowledge can also be equated with acknowledgement of inferior position and is often accompanied with an obligation for reciprocity at some future time.

2.5.4.2.2 Absorptive Capacity Lack of absorptive capacity was found to play a vital role in enabling the sharing of knowledge. In an empirical study of sharing of best practices, Szulanski (1996) found that knowledge transfer is easier when recipients are prepared to receive knowledge. This finding is consistent with Cohen & Levinthal (1990) notion of 'absorptive capacity,' which refers to the stock of prior knowledge that is related to what the recipient possesses. A recipient that lacks such knowledge will be less likely to see the value of new knowledge and will be less likely to be able to integrate it within its knowledge base or apply it commercially.

2.5.4.3 Factors Related to Characteristics of Knowledge The nature of the knowledge shared is often addressed as an important factor. It is thought to affect the rate at which knowledge is accumulated, how much is retained, where is it retained, and how easily is it diffused within and across firm boundaries (Argote, McEvily & Reagans, 2003). So many

researchers found that the more tacit and complex the knowledge, the more difficult it becomes to accomplish the sharing process (McEvily & Chakravarthy, 2002; Dixon, 2000). The value of stocks of knowledge plays an important role for both the source and the recipient. The more valuable the knowledge is, the more likely is it that the recipient will attempt to use it (Gupta & Govindarajan, 1986).

The perspective of *Epistemology of Possession* (Cook & Brown, 1999) describes knowledge as something an individual gains through logic and analytical thinking. For example, facts and data are pieces of information, and once an individual applies logic and makes sense of it, then it can be considered knowledge. This perspective is the traditional understanding of knowledge that is held by many individuals and organizations. Knowledge acquisition process here is highly individualized. The epistemology of possession view of knowledge is rooted in the Western philosophy, which led to placing a high value on an individual's achievement and ownership (Cook & Brown, 1999). We find an expression of that in schools where sharing and collaboration are considered cheating. According to Allee (1997), this perspective of knowledge, with its emphasis on acquiring and 'owning' knowledge is the capitalistic view of knowledge, implying that more knowledge grants more power. This notion leads to the belief that if knowledge is power, one should hoard it, as one seeks to maintain one's power.

Cook & Brown (1999) also introduced other contrasting perspective of *Epistemology of Practice*. Here, knowledge is not seen as personal property of any individual, but it is like a fluid that is accessible to anyone. According to this perspective, knowledge is developed through interactions where social and physical world serves as the parameter for an individual. This type of knowledge is action-oriented, as it is dynamic and comes from learning and doing instead of being the result of static analytic reasoning.

The distinction between explicit and tacit knowledge is related to the epistemologies of possession and practice. Explicit knowledge is easily expressed in words and is described as 'know-what.' It can be expressed through documents and images and in other forms of deliberate communication (Allee, 1997). Tacit knowledge is described as 'know-how,' knowledge that people cannot easily describe such as insights, experiences, and hunches. It is based on mental models of individuals that include beliefs, concepts and values. It is based on communicating context, while explicit knowledge is independent of context (Allee, 1997). Individuals, organizations, and research literature all have different ideas of what constitutes knowledge. While the debate goes on, there appears to be a general consensus around the idea that collective knowledge emerges from the interaction and dialogue among the members of an organization (Wenger & Snyder, 1999).

Weiss (1999) explains that a very common assumption is that '*articulable*' knowledge is easily shared because it can be codified. She believes that the existing distinction between *'articulable'* and *'non-articulable'* knowledge masks critical issues about how knowledge becomes available for use by employees in an organization. Weiss (1999) argues that just because knowledge may be articulated does not necessarily mean that it *is* available for use by other employees. She gives an example of a consultant who could articulate how his team analyzed the client's problem and what they learned from their project, but was unwilling to share this 'articulable' knowledge with another colleague. To address this issue, Weiss distinguishes between *rationalized* knowledge and *embedded* knowledge. Rationalized knowledge is general, context independent, standardized, widely applicable, public, official, and depersonalized. In professional service firms, examples of rationalized knowledge include methodologies for conducting consulting projects, templates for drafting legal opinions, and

standard operating procedures. She maintains that as knowledge becomes more rationalized, its applications are more universal. Embedded knowledge, on the other hand, is specific, context-dependent, un-standardized, narrowly applicable, private, personalized, and unofficial. It might be sensitive, personally or professionally. This type of knowledge is illustrated in how a consultant wanted to understand more about a specific client and how that client responded to a previous service offered by the firm. He wanted to know whether the client liked to be involved in the day-to-day developments of the project, and what kind of presentations the client liked. He was not interested in generic knowledge about how to interact with clients or guidelines for how to deliver good presentations.

Constant, Kiesler & Sproull (1994) tested whether the form of the information (product or expertise) influences the meaning people attach to sharing enterprise knowledge and how people attach different meanings to those categories. The results suggested that an individual's expertise (tacit knowledge) tends to be considered the property of the individual, while products of the organization (documents that communicate enterprise knowledge) tend to be considered property of the organization. Therefore they concluded that the type of knowledge medium can be associated with some relationship to the perception or potential for pro-social sharing.

Uzzi & Lancaster (2003) believe that the relationship between type of tie and the type of knowledge shared appears to be organized around differences in embeddedness and arm's-length ties. They identify arm's-length ties as relationships that are cool, impersonal, and atomistic where actors are motivated by instrumental profit seeking. In contrast, embedded ties embed their commercial transactions in social attachments. In their inter-firm study, they found that arm's-length ties prompt transfer of comparative, objective, and unrestricted information while embedded ties prompt the transfer of idiosyncratic, interpretive and restricted information.

Expectations of trust and reciprocity, associated with embedded ties, lower the risk exchange partners face in sharing valuable private information by ensuring that it is used to the mutual benefit of parties. In contrast, unrestricted nature of public information makes trust superfluous to the transfer process.

2.5.4.4 Factors Related to Social Relationship between Actors Sharing of knowledge, especially when the knowledge shared has tacit components, may require numerous individual exchanges (Nonaka, 1994). An arduous relationship might create additional hardships in knowledge sharing. Szulanski (1996) found that the quality of relationship between the source and the recipient is considered a major barrier to knowledge sharing. Reagans & McEvily (2003) think that formal and informal networks play a critical role in the knowledge sharing process and that our understanding of that role is still somewhat unclear. The next section will cover social networks in order to develop an understanding of how social relationship affect organizational knowledge sharing among different units.

2.6 SOCIAL NETWORKS

Conceptualizing organizations as social communities in which knowledge is structured, coordinated, and shared is central to understanding knowledge sharing and knowledge management. Kogut & Zander (1992) state that a "firm should be understood as a social community specializing in the speed and efficiency in the creation and transfer of knowledge." This is an important and relatively new view on the theory of the firm.

2.6.1 Social Network Perspective

The social network perspective begins with the assumption that actors are embedded in a complex web, i.e. networks of interrelationships with other actors. These networks of relationships provide the opportunities and constraints that may be the causal forces of knowledge sharing (Brass & Krackhardt, 1999). Ibarra (2000) defines social network as a "specific set of linkage among a defined set of persons, with the additional property that the characteristics of these linkages as a whole may be used to interpret the social behavior of the persons involved." Cross et al. (2001) believe that we must pay more attention to the sets of relationships that people rely upon to accomplish their work. They explain that we may think that people turn to databases, Web, intranets, portals, or even traditional repositories such as file cabinets or policy and procedures manuals for their information and knowledge needs. However, a significant component of a person's information and knowledge environment consists of the relationships he or she taps for a variety of information and knowledge needs. Cross & Parker (2004) underscored and stressed the importance of social networks for learning and innovation in organizations.

The social network perspective assumes that relationships are important because they provide access to, and control of, valuable resources, in other words they provide what is referred to as social capital which is the heart of the social network perspective.

2.6.1.1 Social Capital Social capital stresses relationships among people as it is created and found in such relationships (Cohen & Prusak, 2001). Coleman (1988) views social capital as any aspect of informal social organization that constitutes a productive recourse for one or more actors. He believes that social capital is embodied in the relations among persons and he states

that the "group whose members manifest trustworthiness and place extensive trust in one another will be able to accomplish more than a comparable group lacking that trustworthiness and trust." Burt (1992) came up with the idea that social capital refers to relationships with other actors and the accompanying access to information, resources, opportunities and control. For example, we all have friends and colleagues through which we receive or exchange resources. This social capital of people aggregates to the social capital of the organization. According to Burt (1992), profit to be expected from an investment is the product of invested capital multiplied by the going rate of return, where the rate of return is keyed to the social structure of the competitive arena. He identifies two lines of thinking of social capital. The first defines a network as access to people with specific resources, while the second line describes how network themselves are a form of social capital. Social capital in total is the resources that contacts hold and the structure of contacts in a network, or whom you reach and how you reach them. Cohen & Prusak (2001) describe social capital as a measure of how much collaboration, time, and energy people have for each other. Putnam (1993) believes that social capital is not a unidimensional concept as it has many facets. He extends the concept to include groups, communities and even nations. Cohen & Prusak (2001) defined the term *social capital* in the following words:

> Social capital consists of the stock of active connections among people: the trust, mutual understanding, and shared values and behaviors that bind the members of the human network and communities and make cooperative action possible.

2.6.1.1.1 Significance of Social Capital Social capital makes an organization or any cooperative group more than a collection of individuals, intent on achieving their own private purposes. It bridges the space between people. Primary elements of social capital include high level of trust, robust personal networks and vibrant communities, shared understandings, and a sense of equitable participation in a joint enterprise – all things that draw individuals into a group

(Brass & Krackhardt, 1999). This connection supports collaboration, commitment, ready access to knowledge and talent, and coherent organizational behavior. Coleman (1990) believes that the apparent dividends of social capital are better knowledge sharing, lower transaction cost, lower turnover, and greater coherence of action. Building richer, deeper and broader relationships can add social capital to the organization and the people in it. Social capital is the web of relationships among employees and groups (both inside and outside the organization) that provide information, helps solve problems, expands customer bases, and all other things that add value and enhance strategic capability (Scot & Einstein, 2001).

2.6.1.2 Nature of Ties in Organizations Organizations are composed of ties of a myriad nature. Ties can differ according to whether they are based on friendship, work, and advice; and whether what flow through them are resources, information, knowledge or affection; whether they are face to face or electronic, etc. The substance and type of ties in a network can have important implications for action (Nohria, 2000).

Relationships in organizations are essential for getting things done. Formal relationships are typically documented with job descriptions and organizational charts. Every organization also has its informal networks–people who know each other and help each other regardless of rank, function, job title, etc. (Greenburgh, 1983). Ibarra (2000) differentiates between prescribed networks and emergent networks in organizations. He defined prescribed networks as those who are composed of a set of formally specified relationships between superiors and subordinates and among functionally differentiated groups that must interact to accomplish an organizationally defined task. Emergent networks, on the other hand, involves informal, discretionary patterns of interaction where the content of the relationship maybe work related, social, or a combination of both. The emergent network, Galaskiewicz (1979) explains, “develops out of the purposive

action of social actors who seek to realize their self interest, and depending on their abilities and interest, will negotiate routinized patterns of relationships that enhance their interests."

Relationships can range from unidimensional to multi-faceted. For example, an employee may have only a work relationship (unidimensional) with a coworker. She sees the coworker only at work and has nothing to do with her outside the work setting. Alternatively, an employee may have several relationships with the coworker; a work relationship, a personal relationship as a friend outside of work, and the two also may be members of the same association (Scot & Einstein, 2001). The literature suggests that people distinguish between friendship and acquaintance relationships and that different rule govern people's interactions in the two types of relationships (Clark & Mills, 1993). The primary difference between the two types of relations is the amount and type of communication each generates. Research has also shown that individuals share more information with friends than with non-friends (Zaccaro & Lowe, 1988).

To map relationships and networks in organizations and to explain knowledge sharing in terms of the patterns of these relationships, Social Network Analysis (SNA) is used as a tool to explain behaviors in relation to the social context in which an actor is embedded.

2.6.2 Social Network Analysis (SNA)

Social network analysis has roots in social science research that dates back to the 1930s. Moreno (1934), an early social psychologist, envisioned mapping the entire population of New York city for drawing a picture of the connections among a specified group of people (Scott, 2000). Since that time, the field has grown significantly from a methodological standpoint to a global, multidisciplinary society of social network analysis called I*nternational Network of Social Network Analysts.*

2.6.2.1 Development of SNA The fields of sociology, social psychology, anthropology, epidemiology, and organizational behavior have contributed to the development of the discipline of SNA. According to Scott (2000), early contributions of 30's had been approached from three perspectives; sociometric analysis using the graph theory; Harvard's studies on patterns of interpersonal relations and formation of cliques; and the investigations of Manchester anthropologists about the structure of community relations in diverse communities. A breakthrough in the conception of a well-developed methodology of social network analysis was achieved during 60's, when Harrison White of the Harvard School forged together key insights of his predecessors and introduced distinct procedures that were further refined by his students.

During the 1930's, a number of leading German social scientists settled in the United States; Kurt Lewin, Jacob Moreno, and Fritz Heider who made pioneering contribution to the gestalt-influenced social psychology. Although the term sociometrics is particularly associated with Moreno's *soiogram*, it is in an apt description of the general style of research that arose from the gestalt tradition. Moreno (1934) main achievement was to devise the 'sociogram' as a way of representing the formal properties of social configuration. Lewin used mathematical models of group relations for advancing this work, while Heider contributed mainly to the development of theories of group dynamics. Cartwright & Harary (1956) introduced the application of graph theory to group behavior, which carried particular significance in furthering the insights developed by his predecessors.

The theoretical work in the sociometric tradition involved decomposing networks into their constituent sub-groups. This work involved the concepts of *cliques, clusters*, or *blocks*. Radcliffe-Brown influenced the work of two social scientists – W. Lloyd Warner and Elton Mayo – who worked together on Chicago's famous Hawthorne Studies where patterns of group

behavior were analyzed in the social context by using sociograms for describing behaviors. They asserted that social organization of a community consists of a web of relations through which people interact with each other. In 1936, Warner used the term *clique*, which implied informal association of people among whom there is a degree of group feeling and intimacy and in which norms of group behavior have been established. This is undoubtedly one of the earliest uses of this terminology to describe the structure of societies in sub-groups. They also investigated the properties of a cliques. Thus the sociometric tradition of small group research was initiated.

George Homans, during the 40's, stressed that social theory had to be built up from the foundation of a firm understanding of a small-scale social interaction. His theoretical synthesis centered around the idea that human activities bring people into interaction with one another, that these vary in their frequency, duration, and direction, and that interaction is the basis on which sentiments develop among people. Hommans (1961) became identified with the framework of 'exchange theory.'

During the 1950's and 1960's, John Barnes, Clyde Mitchell, and Elizabeth Bott at Manchester University, influenced by the work of Radcliffe-Brown and his Harvard colleagues, emphasized the significance of conflict and change in social networks as compared to the concepts of integration and cohesion. Barnes was influenced by the work of Bott, E. (1955), Bott, E. (1956) and they both began their advances and innovation in British social anthropology. On the other hand, it was Mitchell (1969) who laid the basis for a systematic framework of social network analysis, using the tasks outlined by Nadel (1957). Meantime, Harrison White and his associates at Harvard who pushed the analysis much further and established social network analysis as a

method of structural analysis. Two mathematical innovations helped in that breakthrough; the development of algebraic models of groups, and the development of multidimensional scaling.

SNA has been an outcome of these methodological initiatives, rooted in different disciplines and academic seats of research and investigation.

In the field of Information science, citation data have been used to study the creation of clusters within the literature and the display of this connection in graphic form. Studies by Garfield & Tropie (1964) and Price (1965) utilized citation data for establishing patterns of intellectual interaction in particular fields of science. Garfield & Tropie (1964) conceptualized that citation relationships connect later documents with earlier ones. The totality of such relationships constituted a historical map of genetics. Price (1965) presented citation data in the form of a matrix drawn from the literature of physics and depicted the development of a narrowly defined specialty.

Griffith, a scholar on information issues, had submitted some early thoughts on how *Institute of Scientific Information (ISI)* citation data might be used to study communication and sociology of science (Griffith & Miller, 1970). In subsequent years, to map connections, discernible from scientific literature, Small (1973), Small & Griffith (1974) and Griffith et al. (1974) used the technique of *co-citation analysis*, which establishes a link between two documents by counting the numbers of times they have been cited together. Small & Griffith (1974) tracked clusters of co-cited documents by using data from *Science Citation Index (SCI)* file. Each cluster was a compact grouping of highly cited papers that were precisely targeted on specific topics of current interest. In all previous studies, the document was used as a unit of analysis and co-citation of pairs of documents indicated their distance from each other and permitted their clustering into groups. In essence, the more two documents were cited together, the closer was the relationship

between them, perceived by the citing authors, and the closer they would appear in the graphs (White & Griffith, 1981).

Griffith viewed each cluster as a manifestation of informal communication among a small group of highly focused researchers where co-citation links serve as a manifestation of social structure (Small, 2001). These views were applied to constructing a path to authors co-citation where individual authors relace highly cited documents as nodes on the map (White & Griffith, 1981). Small, on the other hand, focused on highly cited documents, finding ways to build up structure from lower to higher levels via interdisciplinary links (Small, 2001)

In the field of management, interest has often focused on issues of social capital (Adler & Kwon, 2002). SNA, in a business context, has evolved from a collection of quantitative research methods (Kilduff & Tsai, 2003) to a diagnostic tool and a catalyst for organizational change (Cross & Parker, 2004). It has also emerged recently as a strategic tool for knowledge management with specific applications identified by Cross, Parker & Sasson (2003).

- Assessing individual and organizational social capital;
- Ensuring effective knowledge creation and sharing; and,
- Analyzing the extent to which an organization's informal structure supports strategic objectives.

2.6.2.2 Characteristics of SNA SNA is a distinct research method within the social and behavior sciences; distinct because it is based on an assumption that the relationships among interacting units are important. The fundamental difference between a social network explanation and a non-network explanation of a process is the inclusion of concepts and information about *relationships* among units in a study. Pertinent data are relational and critical tests are used for getting distributions of relational properties. In a social network analysis, the

observed attributes of social actors are understood in terms of patterns or structures of ties among the units. Relational ties among actors are primary and attributes of actors are secondary (Wasserman & Faust, 1994). Another distinction is that SNA is amenable to multiple levels of analysis, and can thus provide micro-macro linkages. One way that SNA provides bridges between the micro- and macro orders is that successive levels are embedded in one another. Individual relational ties are the crucial components of dyad; dyads constitute triads; triads are contained in higher order sub graphs; and all are embedded in complete networks (Galaskiewicz & Wasserman, 1994). In addition, SNA can integrate quantitative, qualitative and graphical data, allowing more thorough and in-depth analysis (Kilduff & Tsai, 2003).

2.6.2.3 Focus of SNA Studies Studies using social network analysis are characterized by an emphasis on *structural form*, i.e. patterns and positions or *relational content*--in other words, these are the qualities of network ties (Raider & Krackhardt, 1994).

2.6.2.3.1 Structural Form The structural form of a network is predictive of the actions, i.e. attitudes and behaviors of actors in organizations. From a network perspective, variations in the actions of actors can be better explained by knowing the position or location of actors relative to others in various networks of relationships (Nohria, 2000).

Centrality is one of the major structural properties that have been investigated in many studies. Centrality refers to the extent to which an actor in the network is involved in relationships in a network. The most central actor in a network is the actor with the shortest path between all pairs of other positions in the network (Raider & Krackhardt, 1994). Organizations with highly centralized informal networks may tend to be more mechanistic in their functioning, whereas organizations with multiple centers may be more organic (Kilduff & Tsai, 2003).

Cohesion and *equivalence* are the principles used for sorting actors into common group. Cohesion refers to the extent to which a relationship is surrounded by strong third party connections (Raider & Krackhardt, 1994). *Cohesion* models group actors together if they share strong common relationships with one another. *Equivalence* models group actors together, if they have similar relations with other actors in the organization, even though they may not be directly linked to each other (Nohria, 2000). *Range* refers to the extent to which network connections span institutional, organizational, or social boundaries (Raider & Krackhardt, 1994). Range models are used to explain the extent to which an actor is advantageously positioned relative to others in an organization. They measure the extent to which actors get away with pursuing their own interest[1].

2.6.2.3.2 Relational Characteristics Relational approach emphasizes the content of relations as predictive. Content-bases studies look at the substance of ties such as friendship, kinship, work, advice, mentorship or at a characteristic of alters in the network such as strength of ties (Raider & Krackhardt, 1994).

Foundations in the area of tie strength include Granovetter (1973) work on weak ties. According to the weak-tie hypothesis, more diverse information is likely to derive from weak ties than from strong ties. However, recent research suggests that certain types of strong ties may facilitate the sharing of knowledge (Hansen, 1999; Krackhardt, 2003)

[1] Other characteristics of a network like density and size are discussed in the methodology section.

2.6.2.4 SNA and Knowledge Sharing Studies Studies in SNA and knowledge sharing have either focused on the structural forms of a network and how it affects knowledge sharing in organizations or on the affect of certain characteristics, such as the kinds of ties or strength of ties on knowledge sharing.

2.6.2.4.1 Studies Focusing on Structural Forms Many studies focused on the structural forms either in the form of centrality of the unit, cohesion or social status and how these affect knowledge sharing in organizations.

Tsai (2001) examined how the centrality of an organizational unit's network position affected its performance. Data collected from 24 business units in a petrochemical company and 36 business units in a food-manufacturing company showed that the most innovative and profitable business units were central.

Reagans & McEvily (2003) examined how different features in the network structure of Rand firm affect knowledge sharing. Data collected through a survey showed a positive relationship between social cohesion and the ease of knowledge sharing. They stated that social cohesion around a relationship affected the willingness and motivation of individuals to invest in time, energy, and effort in sharing knowledge with others. They also found that network range was positively associated with the ease of knowledge sharing. Reagans & McEvily (2003) argued that the network range, which presumably establishes ties with different knowledge pools, increases a person's ability to convey complex ideas to heterogeneous audiences.

Thomas-Hunt, Ogden & Naela (2003) investigated the effects of social status and perceived expertise on the emphasis of unique and shared knowledge within functionally heterogeneous groups. Findings of their study showed that perceived experts were more likely than non-experts to emphasize shared knowledge and other member's unique knowledge contributions.

Additionally, they found that socially isolated members participated more in discussions and emphasized more their unique knowledge than did socially connected people.

Tsai & Ghoshal (1998) examined the relationship both among structural, relational and cognitive dimensions of social capital and patterns of resource exchange, using data collected from multiple respondents in the business units of a large multinational electronics company. Results showed that social interactions, a manifestation of the structural dimension of social capital, and trust, a manifestation of its relational dimension, were significantly related to the extent of inter-unit resource exchange which in turn had a significant effect on product innovation.

2.6.2.4.2 Studies Focusing on Relational Characteristics Other studies focused on the *relational* characteristics and how these affect knowledge sharing.

Ingram & Roberts (2000) studied how friendship networks affected the performance of Sydney hotels. They found out that hotel managers who were connected to each other through a dense web of third-party friendship ties shared customers and best practices, which in return increased the profitability of their hotels.

Cross et al. (2001) initiated a research program to assess the characteristics of relationships that 40 managers relied on for learning and knowledge sharing. Using Social Network Analysis (SNA), they mapped the information flow and discovered four different relationship dimensions that are important for effective sharing and learning. These are *knowledge* (knowing what someone else knows), a*ccess* (having access to other parties' thinking in a timely manner), *engagemen*t (actively thinking with the seeker and engaging in problem solving), and s*afety* (ability to admit a lack of knowledge or to diverge in a conversation). Borgatti & Cross (2003)

tested the previous model in two separate research sites and the results strongly supported the model.

Uzzi & Lancaster (2003) believe that the relationship between type of tie and the type of knowledge shared appears to be organized around differences in embeddedness and arm's-length ties. They identify arm's-length ties as relationships that are cool, impersonal, and atomistic where actors are motivated by instrumental profit seeking. In contrast, embedded ties embed their commercial transactions in social attachments. In their inter-firm study, they found that arm's-length ties prompt transfer of comparative, objective, and unrestricted information while embedded ties prompt the transfer of idiosyncratic, interpretive and restricted information. Expectations of trust and reciprocity, associated with embedded ties, lower the risk exchange partners face in sharing valuable private information by ensuring that it is used to the mutual benefit of parties. In contrast, unrestricted nature of public information makes trust superfluous to the transfer process.

Granovetter (1973), a pioneer name in social networks, stated that weak ties are efficient for knowledge sharing because they provide access to novel information and people that would otherwise be disconnected from the group seeking knowledge. Strong ties or relationships are thought to hinder new information and new enterprise knowledge because these relationships are comprised of small groups of actors that already know what everyone knows. Subsequent research has generally supported Granovetter (1982) theory, but later the emphasis switched to the effective character of strong ties (Krackhardt, 2003). The strength of an interpersonal connection was found to affect how easily knowledge is shared (Uzzi, 1997; Hansen, 1999).

Uzzi, B. (1997) found that employees who communicate with each other frequently or who have a strong emotional attachment are more likely to share knowledge than those who communicate

infrequently or who are not emotionally attached. More frequent communication can lead to more effective communication in the form of relationship-specific heuristics. Hansen (1999) explained the role of weak ties in the sharing of codified knowledge across 120 new-product development projects undertaken by 41 divisions in a large electronic company. Hansen suggested that the type of knowledge to be transferred and the type of tie will predict the most efficient time strategy. He found that weak ties helped in the sharing of codified complex knowledge, but impeded the sharing of noncodified complex knowledge. Weak ties, he explained, can be leveraged because groups can reach to a greater number of people. However, he found out that if the contextual needs for knowledge sharing changed and became more complex, then stronger ties provided the highest relative effect.

2.7 SUMMARY

This section has presented a review of pertinent literature and set the context for developing the conceptual framework of the study, presented in Chapter Three. Also, it provided the rationale for proposing a model of the study. Relevant hypotheses have been derived from the same framework in this section. Results of the study will also be presented and discussed in the light of the studies that have been reviewed in this section.

CHAPTER THREE

3 CONCEPTUAL FRAMEWORK

3.1 INTRODUCTION

Research on knowledge management and knowledge sharing is quite diverse. Argote, McEvily & Reagans (2003) presented a framework for organizing relevant literature based on the relative position of the work regarding two critical dimensions: *knowledge management outcomes* (i.e., knowledge creation, retention, and sharing); and *knowledge management context* (i.e., properties of knowledge, properties of units, and the properties of relationships between units).

This study seeks to investigate the association between one element of the knowledge management context, the *relationship between units*, with one of the knowledge management outcomes, *knowledge sharing*.

3.1.1 Assumptions

1. Knowledge in organizations is socially constructed and reflects the collective experiences of its employees.
2. Knowledge sharing is vital for organizations in order to achieve functional competence, fighting entropy, promoting productivity and profitability, and facilitating innovation.

3. Organizations are in important respect social networks and need to be addressed and analyzed as such.
4. Actors and their actions are viewed as interdependent rather than independent, autonomous units. Relational ties between actors are channels for flow of resources; either material like money or nonmaterial like information, knowledge, political support, friendship or respect.
5. Frequency of interaction and closeness are two valid measures for examining the strength of ties.
6. Organizations can develop and adopt formal and informal strategies so as to enrich inter-unit ties and enhance knowledge sharing.

3.2 RELATIONSHIPS BETWEEN UNITS

Why do some business units share their knowledge together while others don't? Scholars have sought to address this question by analyzing the factors that could inhibit or foster knowledge sharing between individuals and groups. Some have tried explaining the behavior of knowledge sharing by personality traits rather than by situational constraints (Hendriks, 1999; Hinds & Pfeffer, 2001). Others have focused on interpersonal relationships; they have adopted a social network perspective that conjectures knowledge sharing is understood largely by attributing behavior to the social context in which an actor is embedded (Reagans & McEvily, 2003; Borgatti & Cross, 2003).

Research has emphasized the benefits for multi-unit companies of pursuing synergy through knowledge sharing and resource sharing among the strategic business units (SBU). Gupta &

Govindarajan (1986) noted that the potential of synergistic benefits from resource sharing varies across strategic contexts. The realization of this potential depends on how effectively linkages between SBU are actually managed. Scholars have focused on similarity in knowledge content among business units, arguing that an organization and its business unit perform better to the extent that units posses related competencies that can be used by multiple units (Farjoun, 1998; Markides & Williamson, 1994). In addition, research about the knowledge-based view of the firm has suggested that social networks facilitate the creation of new knowledge within organizations (Kogut & Zander, 1992; Tsai, 2000). Krackhardt & Kilduff (1990) have also emphasized how social networks facilitate the flow of knowledge and other resources between individuals and groups.

This study undertakes a social network perspective in examining relationships or ties among twenty two units in a financial institution.

A Unit is defined as a distinct functional and/or operational implementation division.

3.2.1 Properties of ties

Social network research heavily focuses on the *structural properties* of networks. Investigators who use this approach explain outcomes in relation to the network form, *i.e.* the position or location of an actor within a social network (Tsai & Ghoshal, 1998; Tsai, 2001). Less attention is paid to the relational characteristics, meaning how different aspects of relationships affect behaviors (Borgatti & Cross, 2003).

Strength of tie is a relational characteristic that has been analyzed by researchers. Studies have been directed primarily at understanding how the strength of a relationship between two parties

is related to the effectiveness of knowledge sharing (Uzzi, 1997; Hansen, 1999; Reagans & McEvily, 2003).

Granovetter (1973) explained the importance of weak ties in understanding certain network-based phenomena like seeking a job. Krackhardt (1992), on the other hand, has illustrated the importance of strong ties, especially in cases of severe change and uncertainty. He believes that strong ties constitute a base of trust that can reduce resistance and provide comfort in the face of uncertainty. Granovetter (1982) himself noted, based on subsequent research, that while weak ties provide people with access to information and resources that are not available in their own social circles, nevertheless, strong ties provide a greater motivation to be of assistance .

3.2.1.1 Contribution of Present Study In investigating knowledge sharing between units in an organization, this study focuses on the strength of ties as an indicator of the quality of the relationship among different units and not on the structural location of the unit in a network.

3.2.1.1.1 Business and Social Ties A review of the available studies that have focused on the strength of relationships between actors led to the identification of one apparent characteristic; most studies focused their research on either weak or strong tie, in general, without identifying the nature of the relationship, or on one type that is often informal in nature. Communities exist in the workplace, just as they do outside the commercial arena: in families, villages, schools or clubs, etc. Businesses rest on patterns of social interaction that sustain them over time. These patterns are built on shared interests and mutual obligations and thrive on cooperation and friendship.

Through well-established sociological theories, communities at work have been divided into two types of distinct human relationships: solidarity and sociability. Goffee & Johnes (1996)

maintain that *solidaristic* relationships are based on common tasks, mutual interests, and clearly understood shared goals. These benefit all the involved parties whether the parties personally like each other or not. Solidaristic relationships are the measure of a community's ability to pursue shared objectives quickly and effectively, regardless of personal ties. Goffee & Johnes (1996) define the construct of *sociability* as "the measure of emotional, non-instrumental relations (those in which people do not see others as a means of satisfying their own ends) among individuals who regard one another as friends."

This study draws upon the previous concepts in identifying two types of ties in a working environment: (1) business ties; and (2) social ties.

Business ties are defined in this study as the linkages between units that are based on common business tasks, mutual interests, and shared goals that benefit all the involved parties, whether they personally like each other or not. *Social ties*, in contrast, are defined as the linkages between units that are based on emotional, non-instrumental relations, in which individuals engaged in these interactions regard one another as friends. Nonetheless, lines can intersect between the two ties where people may have business and social ties with the same individuals.

3.2.1.1.2 Dimensions of Strength Granovetter (1973) laid down four properties of tie strength as a probable linear combination of: (1) amount of time; (2) emotional intensity; (3) intimacy (i.e., mutual confiding); and (4) the reciprocal services that characterize the tie. Granovetter, however, never provided an operational measure, nor studied these elements empirically. Krackhardt (1992) questioned the weight of these four elements and whether these elements count equally toward tie strength. Marsden & Campbell (1984), on the other hand, distinguished between indicators and predictors of tie strength in their study of best-friend ties. In their view, indicators were actually components of tie strength. These included *closeness* as a

measure of intensity of a relationship, and frequency of contact based on the amount of time spent in a tie. Predictors, on the other hand, were the aspects of a relationship that were related to but not treated as components of tie strength. After applying multiple indicator techniques to construct and validate measures of tie strength, Marsden & Campbell (1984) concluded that indicators of strength are strongly correlated to the concept of tie strength while the predictors were not.

Recent studies have used either frequency of interaction or closeness of ties as surrogates for tie strength (Ghoshal, Korine & Szulanski, 1994) or the average of the two indicators of closeness and frequency for measuring tie strength (Hansen, 1999, Hansen, 2002; Reagans & McEvily, 2003). Accordingly, strength of ties is identified around two dimensions in this study: (1) frequency of interaction; and (2) closeness of the relationship.

Frequency of interactions is defined as how often people contact each other for certain reasons.

Closeness of a relationship is defined as the emotional intensity between two actors (Marsden& Campbell, 1984).

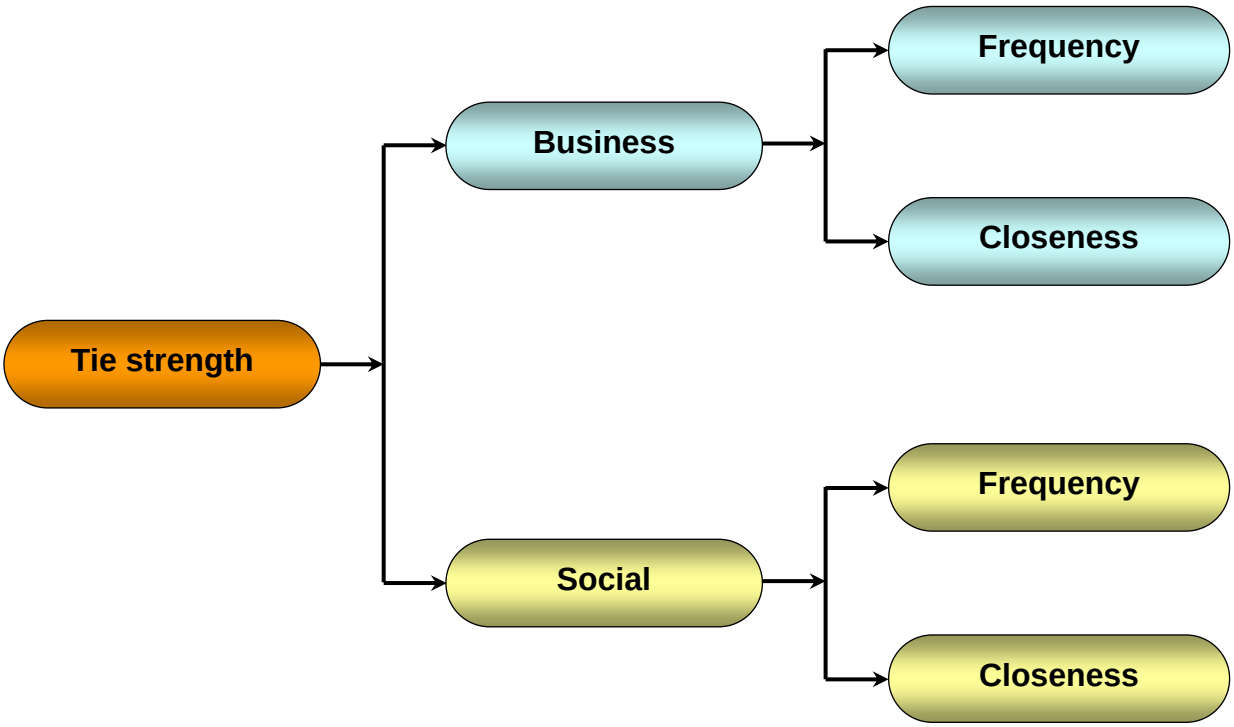

Figure 3.1: Measurement of Ties

The relevance of combining two types of ties, business and social, with two dimensions of tie strength has been established. Such a combination provides a far more specific, robust, and comprehensive view. Because this configuration of tie types has not been studied thus far, to the best of the researcher's knowledge, this study proposes a step forward in the investigation of this combination.

3.2.2 Properties of Knowledge

Social network research has largely remained agnostic with respect to the content of what flows through instrumental relations between actors (Nelson, 1989; Wegener, 1991; Krackhardt, 1992). In contrast, researchers studying product innovation have analyzed difficulties in sharing noncodified or tacit knowledge (Teece, 1977; Zander & Kogut, 1995). Several researchers have

looked at other properties of knowledge besides codification. Weiss (1999) distinguished between *rationalized* knowledge and *embedded* knowledge, while Uzzi & Lancaster (2003) believe that the relationship between type of tie and the type of knowledge shared appears to be organized around differences in embeddedness and arm's-length ties.

3.2.2.1 Codification The primary property of knowledge that has been investigated in most studies is c*odification* of knowledge. Numerous theoretical and empirical studies have focused on this characteristic. Zander & Kogut (1995) looked at horizontal sharing of knowledge among different manufacturing sites. They found that the sharing of manufacturing capabilities was influenced by the degree to which these capabilities were codified. Hansen (1999), Hansen (2002) conducted a network study of 120 new product development projects. Codification of knowledge was the primary element of this study as well as its assessment of the sharing of knowledge. More recent work by Reagans & McEvily (2003) analyzed how features of informal networks affect knowledge sharing. In their research one of the variables tested was *knowledge codifiability* which identifies the degree to which knowledge can be documented. The researchers asked each respondent to describe the codifiability of knowledge in his or her own area of expertise on a 5-item scale, developed and validated by Zander & Kogut (1995).

3.2.2.2 Public vs. Private Knowledge Other studies have explored properties of knowledge other than codification. Uzzi & Lancaster (2003) investigated learning in markets by focusing on how learning occurs between, rather than within, firms. The primary finding of their study is that there are types of informal inter-firm arrangements that promote knowledge sharing and create learning-benefits between firms. They examined the sharing of two types of market knowledge: *public* and *private* knowledge. They defined public knowledge as the knowledge

reported through standard instruments such as company reports, audited financial statements, regulatory filings, advertised bid and ask prices, price quotes, and other forms of prepared information accessible in the public domain. In the opinion of Uzzi and Lancaster , public knowledge is "hard" information, available for the asking, and verifiable through third parties that standardize collection and reporting of information to the market. They defined private knowledge as knowledge that is not publicly available or guaranteed by third parties. Rather, it is "soft" information that deals with idiosyncratic and nonstandard information about the firm, such as unpublished aspects of a firm's strategy, distinctive competencies, undocumented product capabilities, inside management conflict, etc. They found that arm's-length ties prompt sharing of comparative, objective, and unrestricted information, *i.e.* public knowledge, while embedded ties prompt the transfer of idiosyncratic, interpretive and restricted information in other words, private knowledge.

3.2.2.3 Contribution of Present Study With the findings of these studies in mind, it seems that while the ease or difficulty of codification of knowledge is an important concern, by no means does it illuminate the full spectrum of knowledge sharing *within* organizations. Crucially, these findings overlooks differences in the perceived "sensitivity" or "ownership" of knowledge. The fact that knowledge can be codified does not necessarily mean that it is available for use. For example, an employee may be able to document his own impressions about a certain client he worked with for a period of time. This ability to codify or document such knowledge does not imply that this knowledge is, therefore, easier to share with others in the organization. It does not automatically become *public* knowledge. The employee may be reluctant to share this knowledge because it might be sensitive in some details; it may reflect poorly on him in some way. In addition, he may feel that they own this knowledge; that it is a result of his experience

in dealing with a certain client. This feeling of ownership might relate to the feeling of strength when negotiating status or compensation within the organization. Hence, it cannot be assumed that any and every codification of knowledge by an employee will be available for use by other employees. In addition, not every noncodified knowledge is private. Public knowledge like knowing who knows what can not be documented in any form, nonetheless, it is still public in the sense that it can be verifiable through third parties. There is nothing inherently certain, much less automatic, about this process. So, to address this key issue, this study undertakes an extension of the current categories of knowledge -- codified/noncodified and public/private-- to an expanded set of combinations of these attributes that is more reflective of the mix likely to be found in real-world situations.

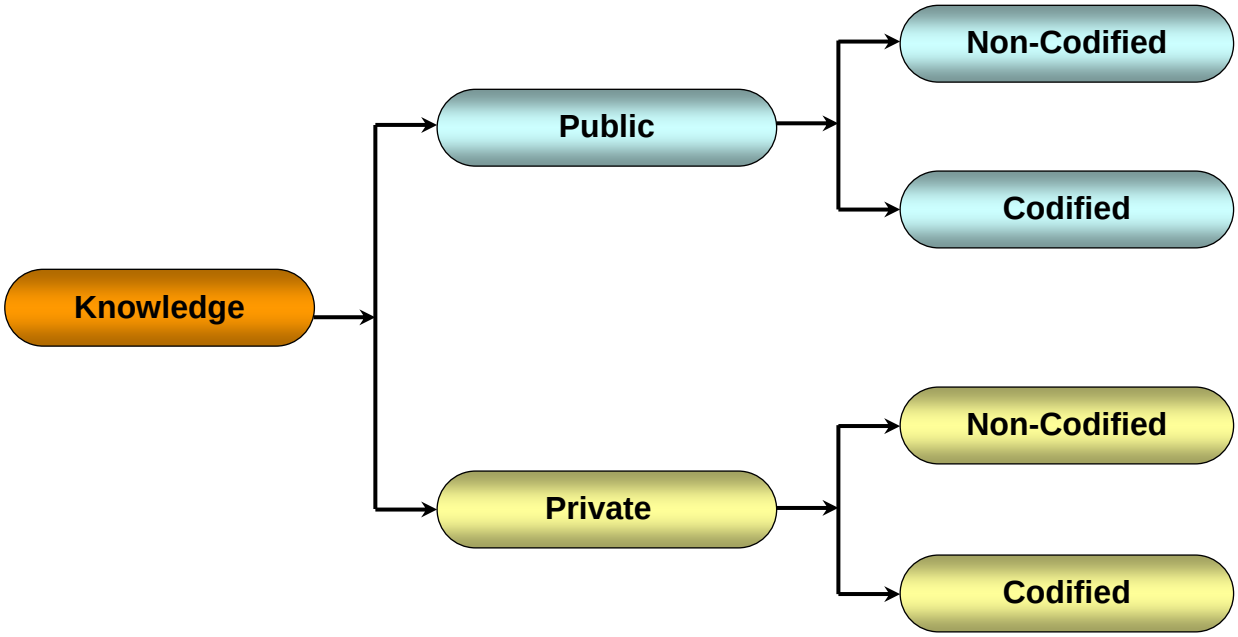

Figure 3.2: Knowledge Types

Based on these assumptions, the following typology of knowledge, as shown in Figure 3.2, was constructed: public (codified, noncodified) and private (codified, noncodified). Each type of knowledge can be defined with unique characteristics that also characterize its differences.

*Public noncodified knowledge***:** This knowledge is general, work-related, context-free, depersonalized, verifiable through third parties, and not documented in any form. For example, it could be the knowledge of who knows what and who is an expert in certain areas, tasks or tools within an organization, etc.

*Public codified knowledge***:** This knowledge is general, context-free, depersonalized, verifiable through third parties, documented in some form and written in the form of standard instruments such as company reports, manuals, audited financial statements, regulatory files, etc. *Private noncodified knowledge*: This is informal or personal knowledge that an individual obtains from direct experience in a given domain. It is context-specific, subjective, personally sensitive, and not documented in any form. Examples are beliefs, viewpoints, insights, experiences, mistakes, failures, etc.

*Private codified knowledge***:** This is informal or personal knowledge that an individual obtains from direct experience in a given domain that is context-specific, personally sensitive, and documented in some form such as e-mail correspondence, personal notes, etc.

The framework that has been developed in the preceding section guides to the formulation of first research question and associated hypothesis.

3.2.3 First Research Question and Hypotheses

Question One The study is proposed to address the following research question:

Are there significant associations between strength of business and social ties and the sharing of public (codified, noncodified) and private (codified, noncodified) knowledge?

To answer this question, the following hypothesis was constructed

Primary hypothesis 1

H1: There is significant association between strength of different types of inter-unit ties and the sharing of different kinds of knowledge.

From the above hypothesis, the following sub-hypothese were constructed. They will direct the testing of prediction potential statistically.

Sub-hypothesis

H1a: A close business relationship is a predictor for sharing of public non-codified knowledge.

H1b: A close business relationship is a predictor for sharing of public codified knowledge.

H1c: Frequency of business interactions is a predictor for sharing of public non-codified knowledge.

H1d: Frequency of business interactions is a predictor for sharing of public codified knowledge.

H1e: A close social relationship is a predictor for sharing of private non-codified knowledge.

H1f: A close social relationship is a predictor for sharing of private codified knowledge.

H1g: Frequency of socializing is a significant predictor for sharing of private non-codified knowledge.

H1h: Frequency of socializing is a significant predictor for sharing of private codified knowledge.

3.3 CLOSENESS OF TIES

Several researchers have tried to address the problem of measuring tie strength. Marsden & Campbell (1984) used multiple indicator techniques on available data regarding friendship ties in an effort to measure this concept. Based on Granovetter (1973) introduction of the concept, they differentiated between indicators and predictors of tie strength. Indicators, in their view, are actual components of tie strength. These include closeness, duration, frequency, breadth of discussion topics, and confiding. Predictors, on the other hand, are aspects of relationships that are related to, but not components of, tie strength. They include such relationships as: neighbor, co-worker, kinship, status, overlapping organizational membership, and measures of social distance. They found that measures of closeness, particularly emotional intensity, were the best indicators of an unobserved tie strength concept. This was asserted as being the case because these measures of closeness were not contaminated by other indicators and predictors in all three samples of the study. Duration tended to overstate the strength of kinship connections, and frequency exaggerated the strength of ties to neighbors. Frequency was also quite weakly associated with both closeness and duration. Mitchell (1987) obtained similar results in a study of strong ties among homeless women.

3.3.1 Second Research Question and Hypotheses

Based on these insights and results, the following question and hypothesis were formulated:

Question 2 Which dimension of the strength of ties is more associated with the sharing of different kinds of knowledge, is it the frequency of interaction or the closeness of the relationship?

Primary hypothesis 2

H2: The dimension of closeness is a stronger predictor for the sharing of different kinds of knowledge compared to frequency of interaction.

From the above hypothesis, the following sub-hypotheses were constructed. They will direct the testing of prediction potential statistically.

Sub Hypotheses

H2a: A close relationship is a stronger predictor for sharing of public non-codified knowledge as compared to frequency of interactions.

H2b: A close relationship is a stronger predictor for sharing of public codified knowledge compared to frequency of interactions.

H2c: A close relationship is a stronger predictor for sharing of private noncodified knowledge compared to frequency of interaction.

H2d: A close relationship is a stronger predictor for sharing of private codified knowledge compared to frequency of interaction.

As has been illustrated in the preceding sections, the primary purpose of this study is to investigate patterns of association between the strength of business and social ties and the sharing of different kinds of knowledge. In addition, it aims to investigate whether the dimension of closeness in measuring tie strength is a stronger predictor of the sharing of all kinds of knowledge compared to frequency of interaction.

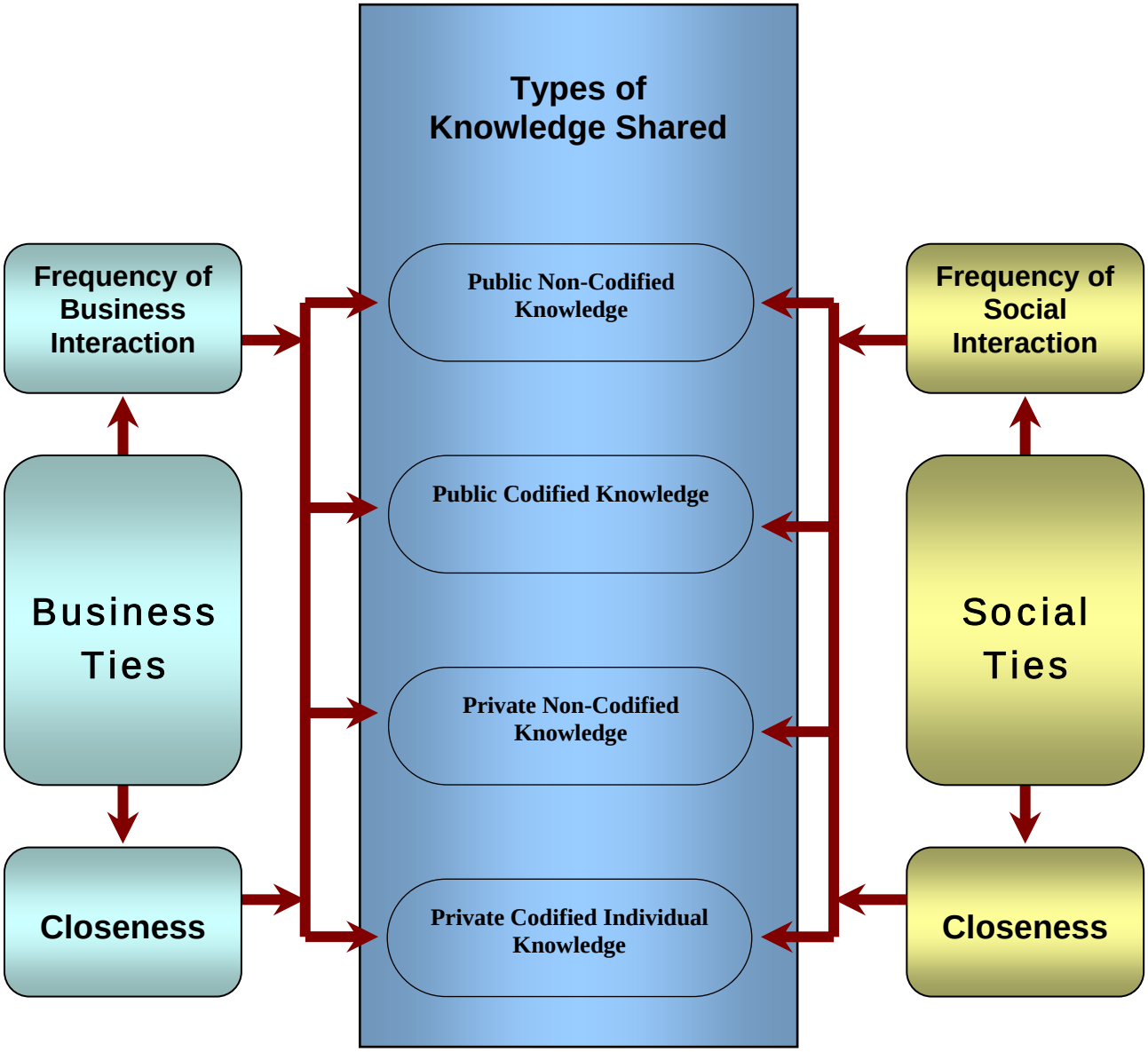

Figure 3.3: Proposed Model

CHAPTER FOUR

4 METHODOLOGY

4.1 INTRODUCTION

This study examines the inter-unit ties of a financial institution and the association of these ties with sharing of different types of knowledge. The study applies social network analysis (SNA) to investigate these associations. This method is now being used in knowledge management research with a fresh vigor and vitality (Borgatti & Cross, 2003; Cross & Parker, 2004)

SNA has existed for many years under different names such as sociometry, interpersonal linkage, social network research, etc. (Freeman, 2004). Moreno was the first to use the term *sociometry* in the 1930s in his study describing social interactions at a girls' school in New York (Moreno, 1934). Later, it was developed as a research tool for sociologists. But even then there was a multi-disciplinary context for its use. Moreno defined SNA from the inter-disciplinary perspective of mathematics, psychology and sociology. It took another ten years for algebraic modeling and graph theory to catch up with the possibilities of sociometry (Scott, 2000). Most recently SNA has been taken up by knowledge managers and business management practitioners as a tool for intellectual capital research and modeling (Mead, 2001; Cross & Parker, 2004). In addition, some researchers in disciplines such as library and information sciences have begun to

employ SNA as a framework for studying the dynamics of information use ASIST (2004).

The SNA approach is grounded in the notion that the patterning of social ties in which actors are embedded has important consequences for those actors. Network analysts seek to uncover various kinds of patterns and they try to determine the conditions under which those patterns arise and to discover their consequences (Freeman, 2004).

The major difference between conventional data and network data is that conventional data focus on actors and attributes while network data focus on actors and relations. The difference in emphasis is consequential for the choices that a researcher must make in deciding on research design, sampling, measurement, and the handling of the resulting data (Hanneman, 2001). Network data (relational data) sets frequently involve several levels of analysis, with actors embedded at the lowest level. SNA studies usually draw the boundaries around a population that is known, *a priori*, to be a network (Hanneman, 2001).

This study utilizes SNA methods for data collection, analysis and reporting of results, as this is the most appropriate, pertinent, and reliable means for arriving at valid results and testing the hypotheses set forth for this study. The choices of organization, of units within the organization, and participants in the study have all been in line with the parameters of SNA method.

4.2 FUNDAMENTAL CONCEPTS AND BASIC VOCABULARY OF SOCIAL NETWORK ANALYSIS

Actors are discrete individual, corporate, or collective social units (Wasserman & Faust, 1994 and are capable of actions (Doreian, Batagelj & Ferligoj, 2005). Examples are people in a group; departments within a corporation; public service agencies in a city.

The Actor set is the entire collection of actors about which measurements are taken. Most social network applications focus on collections of actors that are all of the same type, such as people from one group. Such collections are called *one mode networks* (Wasserman & Faust, 1994). In this study, the actor set are the twenty two units from the bank.

A relational tie is the linkage between a pair of actors. Actors are linked to one another by social ties (Wasserman & Faust, 1994).

Social Networks are the sets of social actors linked by one or more social ties (Doreian & Woodrad, 1994).

Sub-network consists of any subset of sctors and all ties among them (Wasserman & Faust, 1994).

A dyad consists of a pair of actors and the (possible) tie(s) between them (Wasserman & Faust, 1994)

4.3 RESEARCH SETTING

The majority of the studies of knowledge management (KM) and knowledge sharing have been conducted in knowledge-intensive professional service firms. Most cases that describe KM applications are also reported from similar settings in which knowledge serves as the primary resource for these organizations. These firms are generally located in the domains of accounting, consulting, financial services, R&D, etc. Strategists have noted that the key source of competitive advantage for such firms is their knowledge-intensity and the strategies they use for managing and leveraging knowledge (Teece, 1977; Barney, 1991).

For this study, a bank seemed to be an ideal setting. Banks are knowledge–intensive enterprises. Much of the knowledge is highly dynamic and widely dispersed throughout the organization. Knowledge is created and applied through interactions among different units. Because banks operate in an environment with a high degree of uncertainty, they seek an edge through effective knowledge applications. March (1994) holds that imprecision in estimates of future consequences is always conditional on present actions in banking institutions. Mizruchi & Stearns(2001) argue that in organizations with high levels of uncertainty employees heavily rely on social networks for accomplishing their work. This study seeks to examine these assumptions and to uncover whether a bank is actually a suitable setting for the conduct of this study.

Because the researcher of this study is located in the Middle East, profiles of different banks were examined critically to determine the most suitable organization for study. One of these banks, here labeled as IMFC, was found to be the most appropriate site for this exploration. Results of previous studies indicated a strong correlation between knowledge sharing and productivity. IMFC was found to have good performance indicators, and was considered one of the best established banks among banking institutions in the region. Accordingly, these signs were assumed to be good pointers to the existence of knowledge sharing in this corporation. IMFC is an established leader among banking institutions in the region and has the best performance indicators. The bank management was approached for possible participation in the study. After several communications about the objectives of this research and the potential benefits for the bank, a positive commitment was secured from the bank management to participate in the study.

Such a *one-site sampling scheme* is quite common in the literature of network analysis. This method allows for the definition of a clear network boundary for the investigation (Krackhardt, 1990).

4.3.1 Profile of the Participating Organization

The site selected for the study can be described as an international financial corporation with a multicultural character. This institution will be called IMFC in this study to meet a requirement for confidentiality. For the same reason the actual names of units and departments have been changed and an alternative nomenclature has been created. None of these name changes has altered the essence of the relationships discovered and reported in the following sections/chapters.

IMFC ranks as one of the top 300 banks in the world. It is one of the most substantial and credible financial institution in this region.

IMFC achieved significant growth in net profits during the five-year period ending 2004. Over this period, the Bank's average return on equity exceeded 25%. This is reported to be among the highest in the region. The bank is listed on one of the most vibrant stock exchanges in the region.

The Bank offers its clients a wide range of banking and financial services through a large network of branches, automated teller machines (ATMs), point of sale terminals (POS), and an automated call centre. Services are available as well through Internet and mobile networks. In addition, IMFC has one of the largest international subsidiary and branch networks among regional banks, which gives it a presence in major international financial centres all over the

world. The bank has been able to endure and grow despite the political and financial shocks that the region has experienced over the past decades.

4.4 PARTICIPANTS

SNA has specific requirements for the data sets with which it deals. The data are assumed not only to have a finite actor set size, but also an enumerable set of actors. *Actor sets* refers to the twenty two organizational units included in the study; the specific members of such units are referred to as *sets of actors*. Network studies include all the actors who are located within naturally occurring boundaries, bona fide departments, or units. Generally, network studies do not use samples in the conventional sense. Rather, they seek to include all of the actors in some population or populations (Hanneman, 2001).

Defining and locating the boundaries of a network is very crucial. Any error at this point can compromise the use of statistical and mathematical techniques and could lead to analytic confusion (Doreian & Woodrad, 1994).

Another critical consideration in identifying network boundaries is that the researcher does not use only the apparently natural boundaries present in a situation under investigation. Rather, the selection needs to be the outcome of a theoretically informed decision about what is significant in the situation under investigation (Scott, 2000). This means that only those organizational units that are centrally relevant to the purpose of networking investigation should be included.

To identify and define the target population for this study, the *reputational approach* was adopted. In this approach the informed viewpoint of the agents is crucial in determining the

boundaries of the population. The researcher studies all or some of those named on a list of nominees produced by knowledgeable informants. Depending on the purpose of the research, informants who are assessed as having a good knowledge of the target population are asked to nominate who will be included in the study (Scott, 2000).

To identify those units that could be included in the study, the researcher met with both the executive manager and the senior manager of corporate development of IMFC. Each of them had an extensive and thorough knowledge of the organization based on the nature of their work, experiences, and responsibilities over a 10 to 15 year period. They were asked to identify those units in both the profit and cost domains of the bank that were appropriate candidates for networking investigation. In the process of identification of target units, the following considerations were observed:

1. This study could not include those units that were located outside the country in which the bank had its headquarters because of major constraints of time and resources for conducting the necessary research. Those units that dealt with international locations exclusively were also excluded.
2. The fundamental purpose of this study was to investigate possible patterns of association between strength of *business ties* and *social ties* and the types of *knowledge shared* within different units of the organization. Consultations with experienced employees of the bank were used to exclude all units that were judged to have no interaction with other units based on the nature of their functions. The most obvious examples of such units included those dealing with economic research, public and government relations, foreign corporate relations and central cash. Each of these units was essentially self-contained and had little or nothing to do with any other units in the study group.

3. Analyzing networking patterns of those units that have few employees poses practical problems in statistical analyses. It is desirable to combine such units with those with which they have a natural affinity. Additionally it was observed that quite a few units had some inherent relationship with other units, and it was more pragmatic to merge them for the purpose of this study. The practical constraints of available time on the part of bank employees dictated that the study be confined to twenty-two units. It was considered viable to combine small units with other units of bigger size that had fundamental affinities in the nature of their work. Consequently the advertising unit was merged with sales within the retail group; investment banking was combined with brokerage; and institutional banking was merged with marketing within the industry group.

IMFC has eight major functional groups: three belonging to the *profit sector* and five belonging to the *cost sector* of the bank. These eight groups are further divided into units. Twenty-two units were identified and selected for study. *Figure 4.1* provides an organizational chart of the bank which is a presentation of the formal organization. The formal organizational chart clearly indicates one aspect and that is the authority relationship, ie., it shows who has control and formal influence over whom. It does not describe that actual communication paths, ties and intergroup activities which are actually taking place. The actual names of units have been changed on the chart for reasons of institutional confidentiality. The groups and units shaded in green belong to the profit centre while the one's shaded in blue belong to the cost centre.

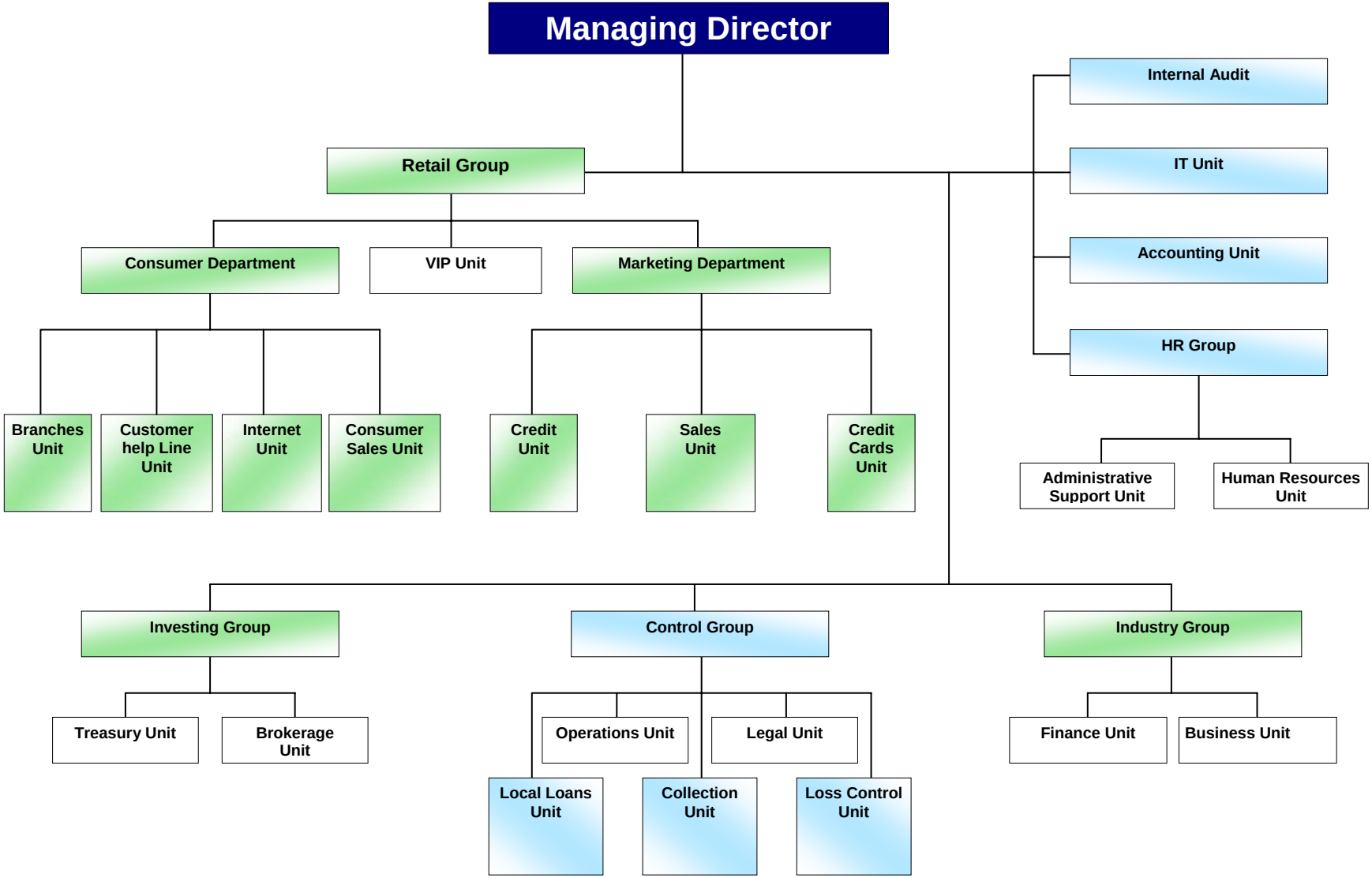

Figure 4.1: Organizational Chart

Table 4.1 lists the eight groups together with the total number of employees in each of them. It is worth mentioning that these numbers are only for those employees that are working in the twenty two divisions identified as organizational *units* for this study. All twenty two units were the actual participants of the study.

Table 4.1 : Profit and Cost Groups

Profit sector	
Groups	Number of employees
Retail group	650
Industry group	103
Investing group	52
Total	805
Cost sector	
Cost groups	Number of employees
IT	124
HR group	85
Control group	208
Accounting	33
Internal audit	16
Total	406

Based on these parameters, the finite number of *actor sets* in this study was determined to be twenty two units belonging to the profit and cost centers of IMFC. Because the actor set consists of units belonging to one organization, this study is considered a one-mode network.

4.5 NETWORK DATA

There are two types of variables that are included in the network data of this study:

- Structural variables: These are the main variables of the social network data set. They measure ties of a specific kind between two actors. This study measures the following eight structural variables or relations:

  Strength of business ties in the form of:

  1. Frequency of interaction
  2. Emotional closeness

  Strength of social ties in the form of:

  3. Frequency of interaction
  4. Emotional closeness
  5. Frequency of sharing public noncodified knowledge
  6. Frequency of sharing public codified knowledge
  7. Frequency of sharing private noncodified knowledge
  8. Frequency of sharing private codified knowledge

- Composition variables: These actor attributes are related to standard social and behavioral composition and are defined at the level of the individual actor (Wasserman & Faust, 1998). This study measures the following seven composition variables:

  1. Geographic location of the division
  2. Job category
  3. Education

4. Nationality
5. Gender
6. Age group
7. Communication channels most and least used

4.6 MEASUREMENT

Social network data differ from standard social and behavioral data in a number of ways. The main difference is that social network data consist of one or more relations measured among a set of actors. The presence of relations reflects on the following measurement issues:

- The unit of observation status is the entity on which measurements are taken. This could be the actor, pair of actors, relational tie, or event. The unit of observation in this study are the actors or all employee belonging to the twenty-two units included in the study. Each respondent completed an online survey instrument *(APPENDIX B) ind*icating his own interactions concerning the eight structural and seven composition variables.
- Modeling unit: Social network data can be modeled or summarized at different levels: actor, dyad, triad, subgroup, and set of actors or network. In this study, properties of relationships were aggregated to the unit level. This was done by measuring the medians for each unit separately. The reason for measuring the median instead of the mean scores is to avoid the effect of "out-layers" if present. Out-layers can strongly affect the mean scores, but these do not have that effect on the median. Therefore, measuring medians instead of means provides more robust results of the data.

- Social network data are often gathered at a level that is different from the level at which they are modeled (Scott, 2000). In this study, data were collected from the employees at the individual level and these were aggregated at the unit level. Nonetheless, data are presented on a network level, which is an overall view of all the dyads in the network (Wasserman & Faust, 1994).

The eight relations measured in this study are all directional and valued. A directional relation between a pair of actors has an origin and a destination, whereas in a non-directional relation the tie between a pair of actors does not have a direction. The second important property of a relation is whether it is dichotomous or valued. Dichotomous relations are coded as either present or absent, whereas valued relations can have a range of values indicating closeness, frequency or intensity of the tie between each pair of actors (Wasserman & Faust, 1994).

4.6.1 Survey Instrument

Data for this study were collected using a questionnaire. This is the most commonly used method in SNA, especially when actors in the study are individual persons and the relations that are being studied are the ones about which the respondent can report (Wasserman & Faust, 1994).

The question format used in this study is called *roster*. According to this technique, the respondents are presented with a complete list, or *roster*, of other actors in the data set. Rosters can only be constructed if the researcher knows the members of the set prior to data gathering, which was the case in this study. A list was provided to the participants with the names of twenty-two organizational units belonging to the profit and cost centers for each question.

Granovetter (1973) was the first to define the concept of tie strength. He defined it as a combination of (1) amount of time, (2) emotional intensity, (3) intimacy (mutual confiding), and (4) the reciprocal services that characterize the tie. Granovetter, however, indicated that these operational measures and their respective weight were premature and required future empirical studies. Pursuant to that injunction a number of studies have been conducted that have relied on a single indicator of strength.

Several researchers have used the frequency of interaction as an indicator of tie strength in their theoretical and empirical research (Granovetter, 1973; Ghoshal, Korine & Szulanski, 1994). Lin, Dayton & Greenwald, 1978) used frequency of contact as indicators of tie strength; where strong ties were assumed to be the more frequent ones. Marsden & Campbell (1984) distinguished between indicators and predictors of tie strength in their study of best-friend ties. In their view indicators were actually components of tie strength. These included *closeness* as a measure of intensity of a relationship, and frequency of contact, which was based on the amount of time spent in a tie. Predictors, on the other hand, were the aspects of a relationship that were related to but not treated as components of tie strength. It was concluded that measures of intensity or closeness were the best indictors for the concept of unobserved tie strength. Erickson (1979) and Murray, Rankin & Magill (1981) used the indicator of *closeness* of a relationship to measure tie strength; thus implying that close friendship meant a strong tie while mere acquaintances was found to indicate a weak tie. On the other hand, many researchers in more recent studies used the average of the two indicators of closeness and frequency to measure tie strength (Burt, R. (1992), 2002; Hansen, 1999, 2002; Uzzi, 1997; Reagans & McEvily, 2003).

These studies have demonstrated an inherent inconsistency in using one measure for tie strength. Therefore, frequency and closeness are treated here as different dimensions of tie

strength. Measuring them as separate dimensions is more effective than measuring one of them or taking the average of the two, which could be a problem if the two are not correlated. In addition, to respond to the second hypothesis of the study, it was essential to measure each dimension of frequency and closeness for business ties and social ties separately. The research instrument was constructed using the same approach.

The instrument designed for this study had two primary components: one related to the perceptions of participants about the strength of their business and social ties with employees of the other twenty-one units; the second related to the type of knowledge they frequently shared with the same units. A final component of the instrument elicited demographic data.

To analyze strength of ties, four questions were constructed. The first two questions measured the strength of business ties while the other two measured the strength of social ties.

4.6.1.1 Independent Variables The initial four questions in the survey consisted of the independent variables:

1. *Frequency of business interaction:* To measure this construct, participants were asked to indicate, on average, the frequency of their working interactions. This was measured on a *Likert scale* with an assigned value of 5 if they interacted daily to a weight of 1 if they interacted once every few months and a "0" for no interactions.
2. *Closeness of business relationship:* Participants were asked to describe their working relationships with employees of the units listed. They were offered a Likert scale ranging between a value of 5 for feeling "very close" to a value of 1 for feeling "distant" and a 0 for no relationship. Brief definitions of the choices were provided to the participants in a written introduction to each question.

3. *Frequency of social interaction:* To quantify the frequency of social interactions rather than business interactions, participants were asked to estimate, on average, the number of times they interacted over coffee breaks, lunches, dinners and so on in and out of the bank. On a Likert scale participants were presented with the value of 5 if a daily interaction took place grading down to the value of 1 if they interacted socially only once every few months and "0" if no social interaction took place.

4. *Closeness of social relationship:* To examine social closeness of employees in different units, participants were asked to describe their social relationship on a Likert scale on which 0 meant no relationship, 1 indicated distant relationship and 5 indicated an extremely close social relationship. A definition of each choice was also provided in this question.

To analyze the extent of the sharing of different kinds of knowledge between the twenty-two units another four questions were constructed using an identical Likert scale.

4.6.1.2 Dependent Variables The other four questions in the survey consisted of the dependent variables. A Likert scale was provided for all four questions on which 5 meant daily interactions, 4, 3, and 2, represented intermediate levels of interaction, and 1 indicated an interaction once every few months while, 0 signaled no interaction whatsoever**.**

1. *Sharing of public noncodified knowledge*: To investigate the patterns of sharing of public noncodified knowledge among different units, each respondent was asked to indicate the frequency of contacts with fellow employees to seek advice and a referral from them to an appropriate resource person whenever they needed a certain skill or competency to assist them with their job.

2. *Sharing of public codified knowledge:* This construct was measured by asking participants about the frequency of their exchange of documents, e.g. (bank memos, reports, financial statements) with employees of the other units listed on the roster.

3. *Sharing of private noncodified knowledge:* Participants were asked to indicate the frequency with which they shared their expertise in face-to-face interactions with employees of the other twenty one units listed.

4. *Sharing of private codified knowledge:* Finally, to measure the frequency of sharing private codified knowledge, participants were asked how often they used e-mails and/or memos for sharing their expertise with employees of other units participating in the study. The research instrument is provided as *APPENDIX B*.

4.6.1.3 Web Survey Because of the large number of employees belonging to the twenty two units which are he participants of the study, a Web-based survey seemed to be the right option as compared with a paper version. Administering the survey to twenty two units that comprise of 1,271 employees in person would be a complicated process, while electronic access would facilitate contacts. Considering the context of the study (i.e. within a knowledge-intensive work environment in which PC's are a major focal point of daily communication) management encouraged this method. In addition, a Web-based survey eliminates the errors that can arise in data entry. The online survey was developed using ASP, HTML and Java Script as the programming languages and was mounted on a server at the University of Pittsburgh to preserve the security of the data and to give the participants the assurance of confidentiality and scholarly intent.

4.6.1.4 Pilot Testing of Instrument The printed version of the instrument was widely circulated among doctoral colleagues and selected faculty members of different universities. They were asked to check the appropriateness, readability and comprehensiveness of the questions. Moreover, they were encouraged to provide their input concerning language, terminology used, scales, and to make any comments they found to be relevant. There were many rounds of revisions and refinements in the process. Based on this valuable input from diverse sources, language/jargon, sentence formation, and even the overall layout were modified.

Finally, after careful review with the executives of the IMFC, a pilot study was designed for checking that the instrument caused no confusion or problems with regard to appropriateness of its semantics, the reliability of the Web tools, the soundness of data storage system and the integrity of the database and the survey instrument on the server of the University of Pittsburgh. For pilot testing, ten employees were selected. They represented a typical participant profile; they were, however, staff members from units not included in the study. They also came from diverse national and cultural backgrounds, again typical of the employees of this organization. They were asked to complete the instrument online and give their input regarding:

- time spent in filling the survey;
- difficulties in understanding any words or questions;
- problems related to the layout of the Webpage, font size, and
- page-to-page and question-to-question navigation.

They were also encouraged to give comments on the cover letter (*APPENDIX B*), ease of access to the instrument on the Web, and other logistic aspects, if any. The participants gave their input on different facets of the cover letter, questionnaire, and navigation of the instrument. Extensive follow-up interviews were held with four of the key pilot study participants. As a result changes

were made in the construction of several questions to eliminate redundancies, shorten the cover letter, and improve a number of navigation features. Every possible precaution was taken to insure that the research instrument had no technical or mechanical snags that might affect its validity or hinder either its administration or the level of participation by the employees of the bank.

Details of these revisions are listed in *APPENDIX C*

4.6.1.5 Administration of the instrument The instrument was administered as follows:

1. An internal e-mail from IMFC's management was sent through the Outlook system addressed to all employees in the twenty-two units participating in the study. It explained the concurrence of the management with the conduct of the study, measures adopted for maintaining confidentiality of responses, and the average amount of time it might take for completing the instrument. The message politely encouraged all employees to participate in this study. It also contained the link to the survey. Finally this internal e-memo specified a deadline for submission of response. This gave a certain momentum and sense of urgency to participation because the survey was available for access by members of the included units for only seven working days.
2. An electronic cover letter from the researcher followed. It introduced the researcher, stated the rationale and significance of the study, and promised total confidentiality for all responses. The importance of participation was also highlighted. The cover letter is displayed in *APPENDIX B*.
3. Another internal e-mail was sent to the same participants as a reminder one week after the first administration. It gave them another day to complete the survey.

Data thus collected went directly into a database at the University of Pittsburgh in Excel format. Responses to each question were stored on a separate excel sheet with an ID number assigned to each survey response. This made it easier to track who answered all eight questions and eliminate those who had not answered in full.

4.6.2 Interviews

It was found prudent to conduct interviews with selected managers (senior staff) and other bankers (junior staff) of IMFC after data had been analyzed and networking relationships had been discerned. The purpose of their interviews was to seek possible insights these managers had about the presence or absence of certain patterns of networking within the twenty-two units of the firm. This approach was found to beneficial in discussing the results of the study.

Analysis of the results reported in Chapter Five indicated the presence of strong horizontal working relationship among employees. To understand these patterns and what factors might be serving as under-currents for the results, it was necessary to have open discussions with these executives and bankers around these points. Discussions in these interviews were focused on aspects that brought forth clues into understanding the working realities at IMFC in light of the results of this study. Important points gathered through interviews have been integrated with the interpretations of the results of the study in Chapter Six.

4.6.3 Summary

This chapter has laid out the methodological foundation of the SNA method used for this study. It has provided the rationale and specific details for the selection of a specific financial institution for the study. Selection of twenty-two units as participants of the study was

explained. A Web-based survey was constructed to gather data for analyzing the strength of personal and social ties in the sharing of four types of knowledge. The instrument was pilot-tested and administered electronically through the company's internal e-mail system.

CHAPTER FIVE

5 DATA ANALYSIS & RESULTS

5.1 INTRODUCTION

This chapter presents the data analysis and a summary of the results. The methods and procedures of this analysis are described. The results provide information about response rate, description of size, density, and correlation of the eight networks studied. This chapter includes also graphic displays of the networking relationships and tables presenting the results of the statistical testing of the hypotheses.

5.2 RESPONSE RATE

A total of twenty two units belonging to the profit and cost centers were invited to participate in the study. Employees from all twenty two units filled the survey but with varying degree of participation. Any partial responses were excluded from the data analysis. Only responses to the full eight questions were included and aggregated to the unit level.

A detailed breakdown of the response rates is given in *APPENDIX A*

5.3 STATISTICAL PROCEDURES

The following steps were followed to give the data appropriate treatment:

1. Data were initially gathered in *Microsoft Excel 2000* spreadsheets automatically as and when a respondent completed her/his participation and exited the questionnaire. The fact that there was no human intervention in data entry enhanced the reliability and accuracy of data thus secured.
2. Median scores were used instead of mean scores because the frequency of the responses did not exhibit a normal distribution. Because the mean scores were found to be highly skewed it prompted the use of median scores for more robust results.
3. SPSS (Statistical Package for Social Sciences) was used to compute medians. The *compare means* function under *analysis* was used to obtain these scores. Each particular unit was specified as a dependent variable, while the responses were used as the independent variable in this process.
4. After obtaining median scores, median matrices were created for each question. Median scores were posted to an Excel work sheet to obtain a square matrix sheet for each question. The values were read laterally.
5. These matrices were imported into *Ucinet 6 for Windows* software, which is specialized for Social Network Analysis (SNA). UCINET is a menu-driven window program, which means that a user can select items from a menu. Choosing an item from a menu may call up a submenu with additional choices. This software can read and write a multitude of differently formatted text files, as well as Excel files. In UCINET 6.0, all data are stored and described as matrices. SNA methods in this package include centrality measures, subgroup identification, role analysis, elementary graph theory, and permutation-based

statistical analysis. In addition, the software has matrix analysis routines, such as matrix algebra and multivariate statistics (Borgatti, Everett & Freeman, 2002)

5.3.1 Size, Density and Correlation of Social Networks at IMFC

Fundamentally, this study dealt with eight relationships within IMFC. Medians represented in the network matrices were the basis for creating graphic representations of tie-strength and sharing of different kinds of knowledge (see below). In the process, the following eight sets were used:

1. Frequency of business interaction
2. Frequency of social interaction
3. Closeness of working relationship
4. Closeness of social relationship
5. Frequency of sharing public noncodified knowledge
6. Frequency of sharing public codified knowledge
7. Frequency of sharing private-noncodified knowledge
8. Frequency of sharing private-codified knowledge

5.3.1.1 Construction of Adjacency Matrices Because this study is based on the construction of these matrices, it was necessary to employ previously validated standard procedures for their formulation. The primary matrix used in SNA is called adjacency matrix or sociomatrix. Researchers refer to this matrix as an *adjacency matrix* because the entries in the matrix indicate whether two nodes are adjacent or not (Wasserman & Faust, 1994).

As noted above each respondent had indicated his/her opinion on the frequency of six relationships and the closeness of two relationships with employees from the other twenty-one

units. Individual responses were aggregated by taking the medians of these responses for each unit. Thus the entry ***i, j*** in the matrix equals the median value of unit ***i'***s opinion with that of unit ***j*** regarding that particular relationship. The resulting adjacency matrix was given the label of the respective nature of relationship. Using this procedure, the following eight networks were constructed following the sequence of the previous eight relationships:

1. *Business* network (business frequency network)
2. *Social* network(social frequency network)
3. *Working* network(closeness of working relationship network)
4. *Informal* network(closeness of social relationship network)
5. *Pubnoncod* network (public noncodified network)
6. *Pubcod* network (public codified network)
7. *Privnoncod* network (private noncodified network)
8. *Privcod* network (private codified network)

The size of a network is determined simply by counting the number of ties or relationships. In any network there are {KxK-1} uniquely ordered pairs of ties, where K is the number of actors and entry (***i , j)*** is different from ***(j, I)*** if the data are asymmetric as is the case in this study, leaving aside self-ties (Hanneman, 2001). In this study, K= 22 (number of units).

5.3.1.2 Density of Eight Networks To ascertain how close a network is to realizing its maximum potential, the *density* of each network was measured. *Density* is expressed as a proportion of the total possible number of ties. It describes the general level of linkage among the actors in a certain network (Scott, 2000). Density for the eight networks is displayed in **Table 5.1**.

Table 5.1 : Density of Eight Networks

Network	Density
Business	.688
Social	.238
Working	.643
Informal	.351
Pubnoncod	.535
Pubcod	.502
Privnoncod	.429
Privcod	.450

In comparing the densities of each network, it is clear that about 69% of all possible ties are present in the *Business* network (i.e., the frequency of on-the-job interactions). The density of the frequency of respondents' *social* interactions is 24%, a sharp contrast to business connections. A similar apparent dichotomy can be discerned in the closeness of *working relationships* in which about 64% of all possible ties are close while only about 35% show closeness in *social ties*.

In the following graphical representations of the knowledge sharing networks, the sharing of public knowledge between units, whether codified or noncodified, is clearly shown to be practiced more than the sharing of private knowledge. These data are displayed in **Figure 5.4-Figure 5.8.**

Figure 5.1 and **Figure 5.2** provide a contrast between the frequency of business interactions and the frequency of social interactions. Business interactions appear much denser than social interactions, which appear to be comparatively weaker. Likewise, when **Figure 5.3** and **Figure**

5.4 are compared, the working closeness displays much more intensity as compared to social closeness. A comparable graphic image of public noncodified and public codified knowledge, however, fails to show any major difference in terms of density of relationship. As well, private noncodified and private codified knowledge appear to have quite similar relationships and do not offer any obvious contrasts.

Figure 5.1 to **Figure 5.8** were constructed using Net Draw program which is integrated with UCINET for visualizing and drawing diagrams of social networks. This program can handle multiple relations at the same time, and can use mode attributes to set colors, shapes and sizes of nodes. Pictures can be saved in metafile, jpg, gif and bitmap formats. Net Draw reads UCINET DL files, Pajek files, and its own VNA format that allows saving network and attribute data together, along with layout information like spatial coordination, colors, etc.

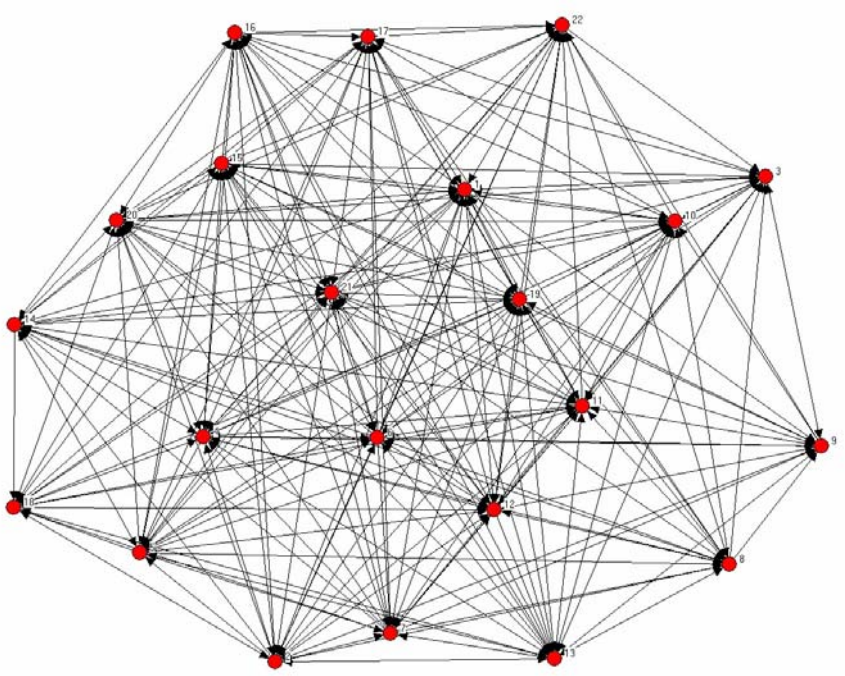

Figure 5.1 : Business Interactions

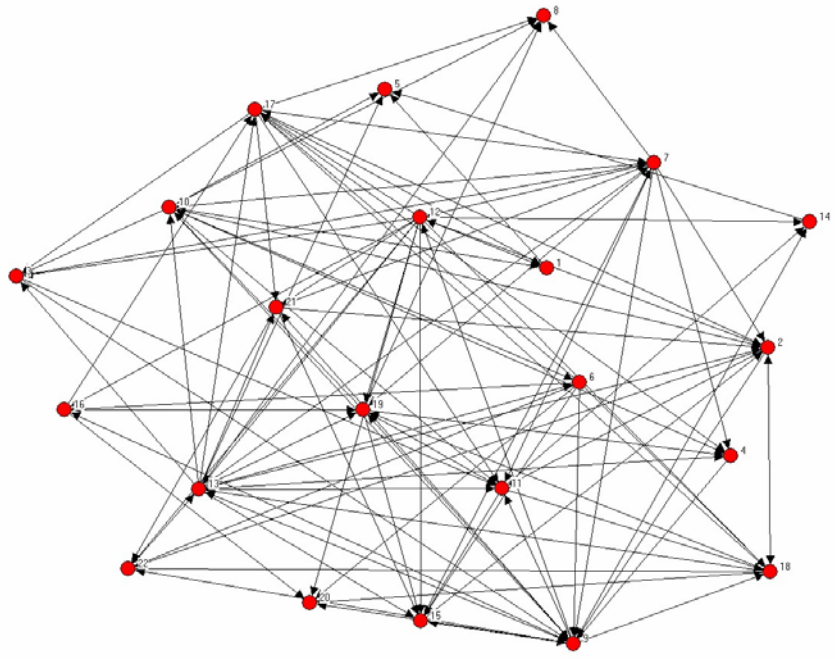

Figure 5.2 : Social Interactions

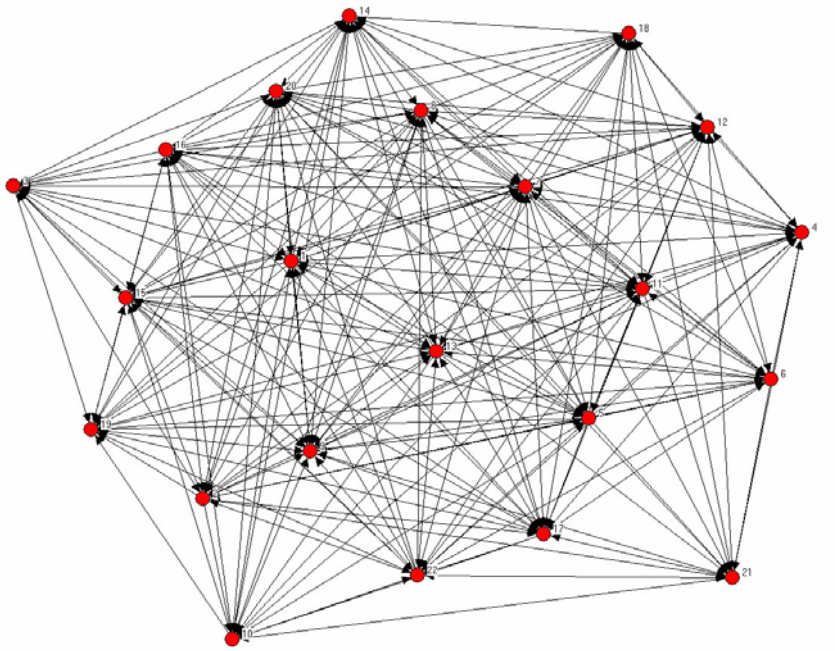

Figure 5.3 : Working Closeness

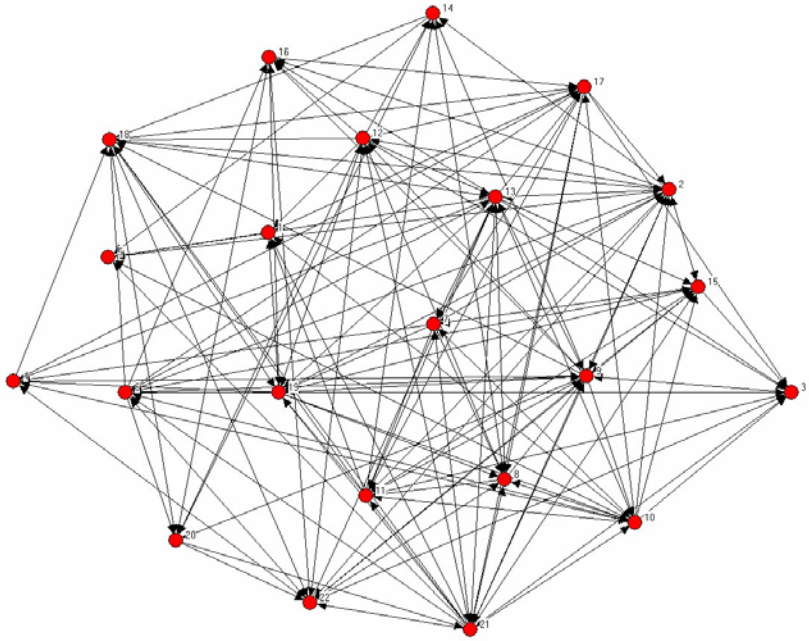

Figure 5.4: Informal Closeness

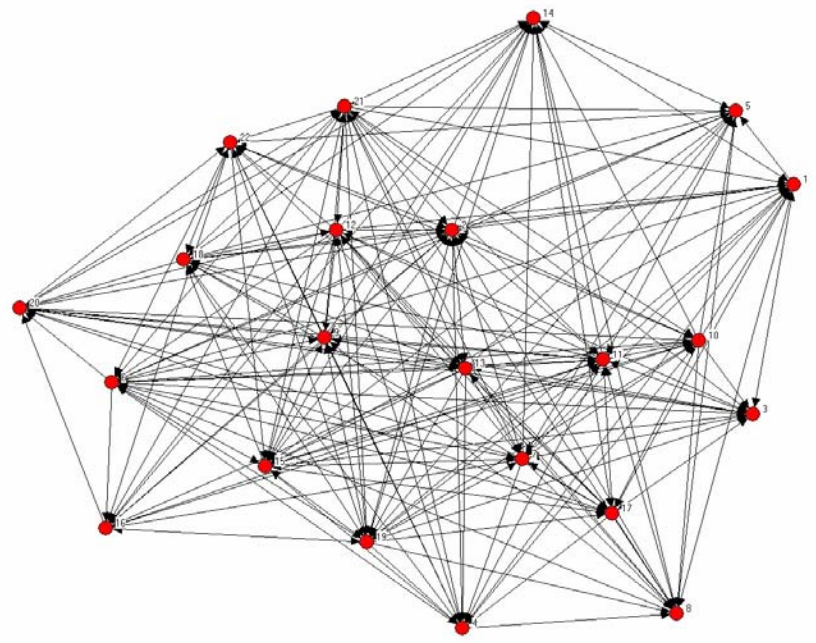

Figure 5.5: Public Noncodified Knowledge Sharing

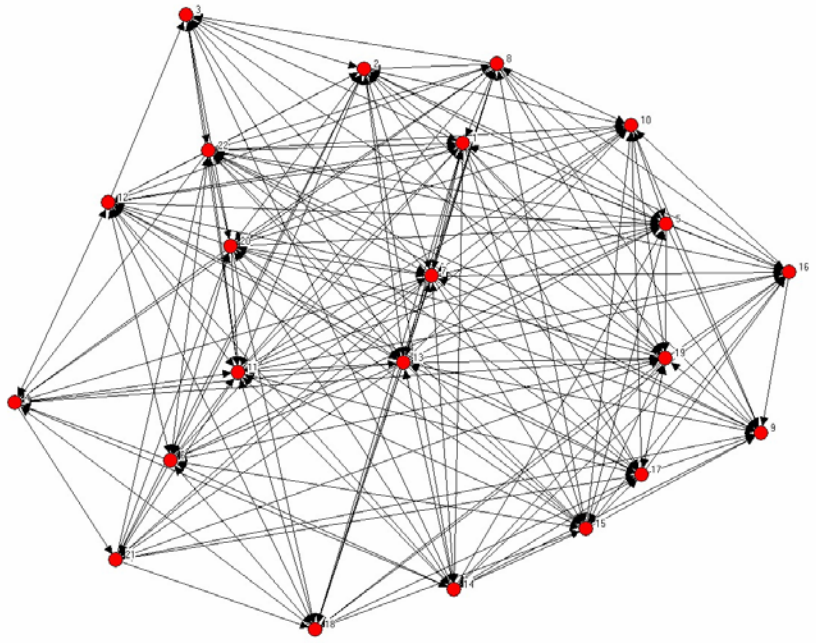

Figure 5.6: Public Codified Knowledge Sharing

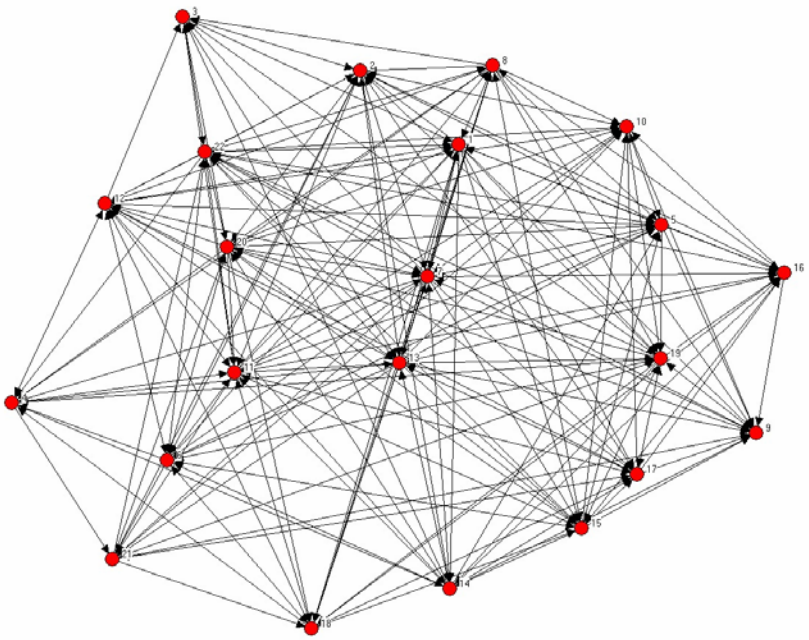

Figure 5.7: Private Noncodified Knowledge Sharing

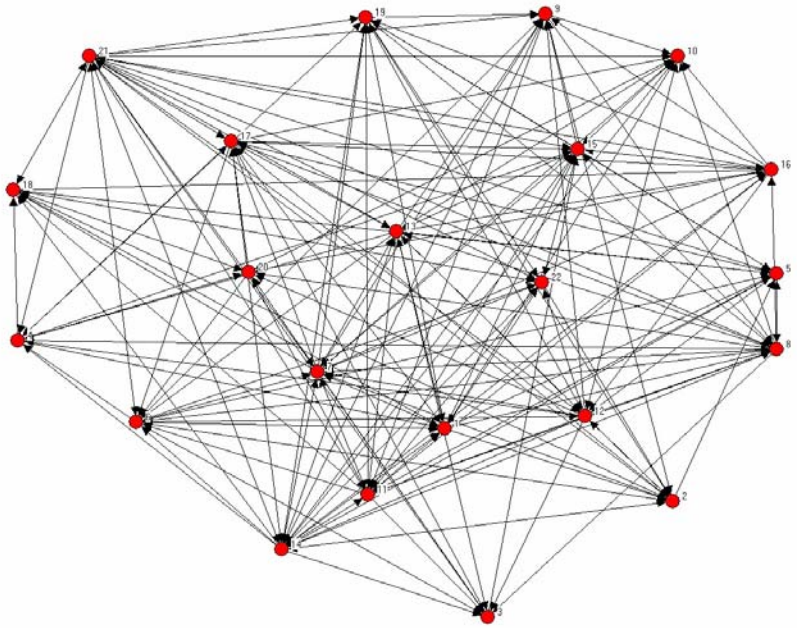

Figure 5.8: Private Codified Knowledge Sharing

These networks appear to be cohesive, in general. In other words, there are no subgroups that are split off from the larger group. This is often a healthy sign in networks because factions that have become separated from the overall network often represent untapped human resources and in worst case scenarios, can reflect political problems.

5.3.1.3 Correlation among Eight Networks The QAP (Quadratic Assignment Procedure) significance test for correlation was used. QAP is suitable for those data that are in matrix form (Kilduff & Krackhardt, 1994). **Table 5.2** presents the correlation results for the eight networking constructs of this study. The significance level $p<.05$ was employed for identifying significant relationships

As is evident from **Table 5.2**, frequency of the working interaction is highly correlated with both the frequency of social interaction and the closeness of the social relationship. One interesting observation to be made is that the frequency of business interaction and the closeness of the same business relationship are not correlated while the frequency of social interaction and the closeness of the social relationship are significantly correlated.

From these correlation results it can also be seen that the sharing of public noncodified knowledge was significantly correlated with the frequency of working interaction, frequency of social interaction, and the closeness of social relationship. In contrast the sharing of public codified knowledge was correlated only with the closeness of the working relationship. Sharing of private noncodified knowledge also significantly correlated with the closeness of working relationship; however, sharing of codified private knowledge was not correlated with any other type of tie.

Table 5.2: Correlation among Eight Networks

Variable	1	2	3	4	5	6	7
1. Business	1.00						
2. Working	-.028						
	(.274)						
3. Social	.557	-.011					
	(.000)	**(.423)**					
4. Informal	**.693**	**-.018**	**.826**				
	(.000)	**(.373)**	**(.000)**				
5. Pubnoncod	.802	-.021	.632	.751			
	(.000)	**(.342)**	**(.000)**	**(.000)**			
6. Pubcod	-.022	.823	.020	.026	.014		
	(.342)	**(.000)**	**(.353)**	**(.325)**	**(.378)**		
7. Privnoncod	.043	.762	. 115	.120	.094	.819	
	(.201)	**(.000)**	**(.052)**	**(.057)**	**(.082)**	**(.000)**	
8. Privcod	.078	-.019	.054	.071	.086	.044	.049
	(.066)	**(.375)**	**(.180)**	**(.152)**	**(.090)**	**(.244)**	**(.217)**

5.3.2 Regression Analysis

The primary focus of this study is to determine whether there are any predictive patterns between tie-strength and the sharing of the four types of specified knowledge. To test the two hypotheses the technique of Multiple Regression Quadratic Assignment Procedure (MRQAP) was

employed. This test was designed and improved by Krackhardt (1988) building on the work done by a number of predecessors (Hubert & Schultz, 1976; Hubert, 1983, 1985). MRQAP is a network regression technique that allows the analysis of relational data of social networking that is systematically interdependent. What make network data particularly troublesome is the autocorrelation that compromises the estimated standard errors (Krackhardt, 1988). The main advantage of MRQAP is that it is robust against varying amounts of row and column autocorrelation in the dyadic data thus reducing the bias resulting from the interdependence of observations if Ordinary Least Square techniques (OLS) are used (Doreian & Chi-Hsien, 1984).

MRQAP is a nonparametric statistical algorithm that regresses a dependent matrix against one or several independent matrices. Using this technique the researcher first performs a standard multiple regression analysis across corresponding cells, in which each cell reflects a dyad of dependent and independent matrices. Then a random permutation of the rows and columns of the dependent matrix is performed for recalculating the regression model. This permutation regression process is repeated many times for estimating the standard error for the statistic of interest while keeping the resultant values of r-square and all coefficients for each rearrangement in store (Kilduff & Krackhardt, 1994).

Tsai & Ghoshal (1998) used MRQAP to test how each dimension of social capital in the form of social interaction, trust, and shared vision contributed to resource exvhange between 15 business units in a multinational electronics company. They found that social interaction and trust were significantly related to the extent of inter-unit resource exchange, which in return had a significant effect on product innovation.

In her dissertation, Yip (2000) examined the inter-organizational factors associated with the organization of elder care systems using MRQAP. Her results showed that across all

communities, more service providers participated in client and information exchanges more frequently than money and staff resources.

Kilduff & Krackhardt (1994) performed MRQAP to test whether or not the prominence of an individual's most prominent friend will influence the individual's performance reputation in an organization. In addition, they tested whether measures of perceived network relations will lead to better predictions of performance reputation than will measures of actual network relations. Results showed that friendship with prominent others did boost individual's performance reputations, but this effect depended on how the friendship links were assessed and this part supported the second hypothesis.

The statistical package of UCINET VI (Borgatti, Everett & Freeman, 2002) was used for conducting the MRQAP algorithm test to determine how the four independent variables relating to strength of working ties and social ties effect the sharing of the four types of knowledge which are the dependent variables in the study. This package offers four permutation schemes for MRQAP; the original Y permutation method was used in this study.

The results of MRQAP were used in examining whether the strength of the four types of relationships significantly predicted sharing of four kinds of knowledge.

5.3.2.1 Tie-Strength and Public Noncodified Knowledge It was found that altogether these four independent variables explained about 72% of the variance for the sharing of noncodified public knowledge. The prediction potential for the frequency of social interactions and closeness of working relationships, however, was found to be insignificant for the sharing of noncodified public knowledge. Yet, in contrast, the frequency of working interaction and

closeness of social relationships had meaningful prediction potential at the significance levels of .000 and .005, respectively.

Table 5.3: Coefficients for Sharing of Public Noncodified Knowledge

Intercept	0.0000 (1.000)
Frequency of working interaction	0.5433 **(0.000)**
Closeness of working relationship	0 .0014 **(0.480)**
Frequency of social interaction	0.0634 **(0.242)**
Closeness of social relationship	0.3223 **(0.005)**
R-square	0.718

5.3.2.2 Tie-Strength and Public Codified Knowledge Only the closeness of the working relationship had a significant prediction potential for the sharing of public codified knowledge (significance level of .000) while the other three independent types of relationships had no such impact. It was further noted that these four types of relationships were responsible for about 68% of the variance (R-square = .681).

Table 5.4: Coefficients for Sharing of Public Codified Knowledge

Intercept	0.0000 (0.000)
Frequency of working interaction	-0.0534 **(0.207)**
Closeness of working relationship	0.8235 **(0.000)**
Frequency of social interaction	-0.0177 **(0.459)**
Closeness of social relationship	0.0931 **(0.228)**
R-square	0.681

5.3.2.3 Tie-Strength and Private Noncodified Knowledge Only the closeness of the working relationship was a significant predictor (significance of .000). The other three relationships were found to be insignificant. **Table 5.5** shows that together these four independent variables explain about 60% of the variance in sharing private noncodified knowledge where R-Square = .601.

Table 5.5: Coefficients of Private Noncodified Knowledge

Intercept	0.0000 (0.000)
Frequency of working interaction	-0.0525 **(0.229)**
Closeness of working relationship	0.7636 **(0.000)**
Frequency of social interaction	0.0378 **(0.313)**
Closeness of social relationship	0.1393 **(0.143)**
R-square	0.601

5.3.2.4 Tie-Strength and Private Codified Knowledge It was found that none of the four types of relationships had any significance higher than the criterion of .05, suggesting that all of them were insignificant. The R-square value for these variables was found to be .007, indicating that these variables had little meaning in terms of the predictability of the sharing of private codified knowledge. These results are shown in **Table 5.6.**

Table 5.6: Coefficients for Private Codified Knowledge

Intercept	0.0000 (0.762)
Frequency of working interaction	0.0558 **(0.219)**
Closeness of working relationship	-0.0172 **(0.410)**
Frequency of social interaction	-0.0102 **(0.490)**
Closeness of social relationship	0.0399 **(0.384)**
R-square	0.007

5.4 HYPOTHESIS TESTING

This section discusses the testing of the two major hypotheses of the study. These are illuminated by a number of sub-hypotheses.

The results of the MRQAP coefficients, already reported in Table Table 5.3-Table 5.6, were used in testing these hypotheses. The criterion of significance was set to be 0.05 for this test.

5.4.1 Hypothesis 1

There is a significant association between strength of different types of inter-unit ties and the sharing of different kinds of knowledge.

5.4.1.1 Sub-Hypotheses

H_1a A close business relationship is a predictor for sharing of public noncodified knowledge.

H_1b A close business relationship is a predictor for sharing of public codified knowledge.

H_1c Frequency of business interactions is a predictor for sharing of public non-codified knowledge.

H_1d Frequency of business interactions is a predictor for sharing of public codified knowledge.

H_1e A close social relationship is a predictor for sharing of private noncodified knowledge.

H_1f A close social relationship is a predictor for sharing of private codified knowledge.

H_1g Frequency of socializing is a predictor for sharing of private noncodified knowledge.

H_1h Frequency of socializing is a predictor for sharing of private codified knowledge.

A summary of findings with respect to Hypothesis One and the eight sub-hypotheses is given in **Table 5.7.**

Table 5.7: Summary of the Results of the Testing of Hypothesis 1

Significantly predicts the sharing of **public noncodified knowledge**		
H_1a	Closeness of business relationship	not supported
H_1b	Frequency of business relationship	supported
Significantly predicts the sharing of **public codified knowledge**		
H_1c	Closeness of business relationship	supported
H_1d	Frequency of business relationship	not supported
Significantly predicts the sharing of **private noncodified knowledge**		
H_1e	Closeness of social relationship	not supported
H_1f	Frequency of social relationship	not supported
Significantly predicts the sharing of **private codified knowledge**		
H_1g	Closeness of social relationship	not supported
H_1h	Frequency of social relationship	not supported

5.4.1.2 Finding for Hypothesis 1 Based on the results reported in the preceding section, it is concluded that hypothesis one is partially supported.

A visual illustration with respect to Hypothesis One and the eight sub-hypotheses is given in **Figure 5.9**.

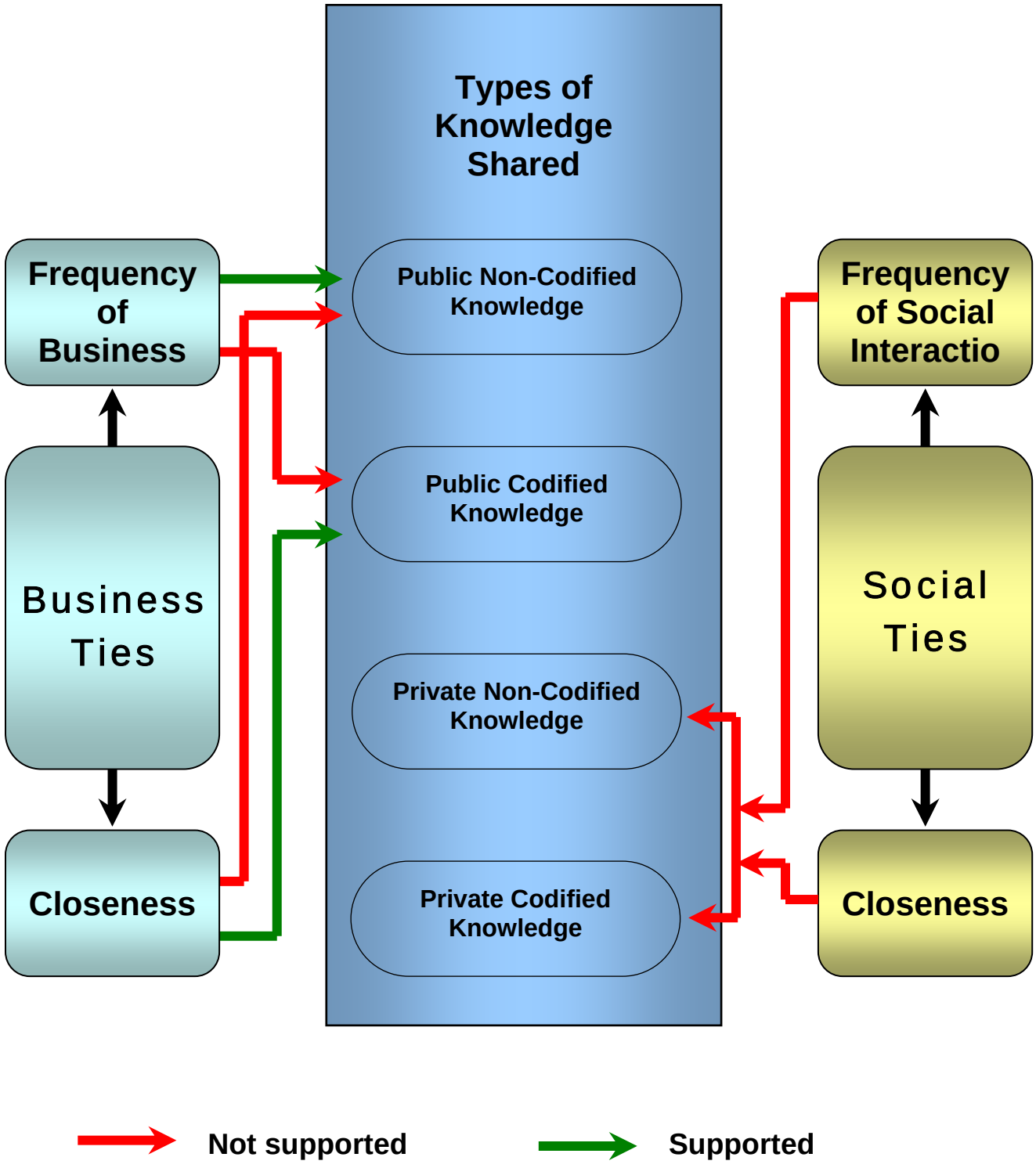

Figure 5.9: Model for Sub-Hypothesese 1

5.4.2 Hypothesis 2

The dimension of closeness is a stronger predictor for the sharing of different types of knowledge compared to frequency of interaction.

Two types of ties were measured for closeness —the working tie and the social tie —and for frequency of interaction —working interaction and social interaction. The MRQAP test results were used to assess the coefficient values and significance values for each of these closeness and frequency variables. Results given in Table Table 5.3-Table 5.6 were used for testing four sub-hypotheses to conclude whether and to what extent Hypothesis 2 was supported.

5.4.2.1 Sub-Hypotheses

H_2a A close relationship is a statistically stronger predictor for *sharing of public noncodified knowledge* as compared to frequency of interactions.

H_2b A close relationship is a statistically stronger predictor for *sharing of public codified knowledge* as compared to frequency of interactions.

H_2c A close relationship is a statistically stronger predictor for *sharing of private non-codified knowledge* as compared with frequency of interactions.

H_2d A close relationship is a statistically stronger predictor for *sharing of private codified knowledge* as compared with frequency of interactions.

A summary of findings for the testing of Hypothesis 2 is given in **Table 5.8.**

Table 5.8: Summary of the Results of the Testing of Hypothesis 2

Public noncodified knowledge	
H_2a Closeness a stronger predictor than frequency	not supported
Public codified knowledge	
H_2b Closeness a stronger predictor than frequency	supported
Private noncodified knowledge	
H_2c Closeness a stronger predictor than frequency	supported
Private codified knowledge	
H_2d Closeness a stronger predictor than frequency	not supported.

5.4.2.2 Finding for Hypothesis 2 Based on the results reported in the preceding section, it is concluded which Hypothesis 2 is partially supported.

A visual illustration with respect to Hypothesis Two and the four sub-hypotheses is given in **Figure 5.10**.

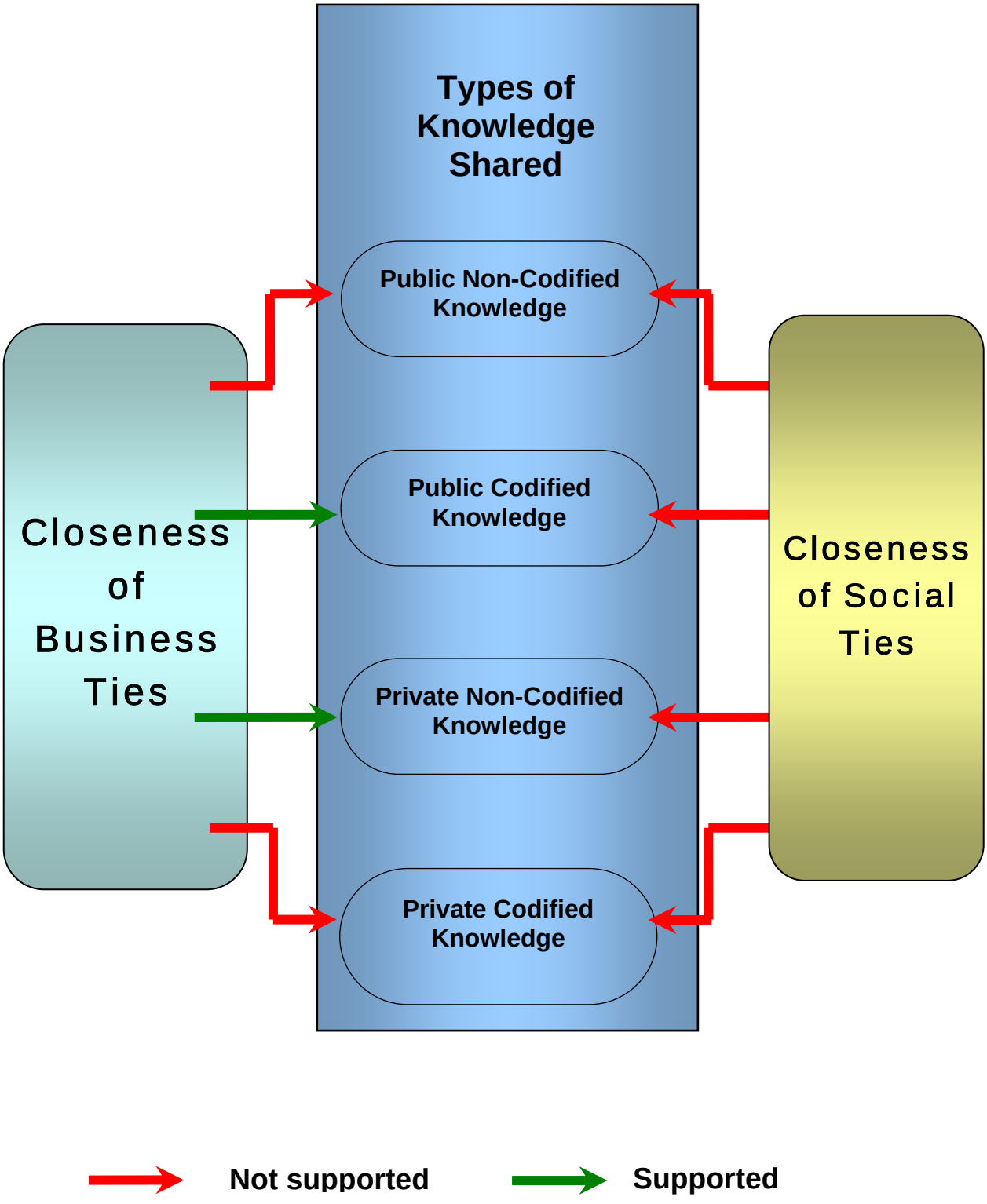

Figure 5.10: Model of Sub-Hypotheses 2

CHAPTER SIX

6 SUMMARY AND CONCLUSIONS

6.1 INTRODUCTION

This study has examined the effect of different relationships on knowledge sharing in a financial institution using the perspective of social networking. It offers new possibilities for social network research, moving a step forward from the current mainstream that focuses heavily on structural properties such as cliques and centrality. This investigation explored how the characteristics of relationships, specifically the strength of ties in the form of closeness and frequency of interaction, underlie knowledge sharing in organizations. This research took into consideration how different types of relationships affect sharing of different types of knowledge in the setting of a financial institution. Certain conclusions of this study have been reviewed in this chapter and are both revealing and insightful.

6.2 AIMS OF THE STUDY

This research had two main purposes. First and foremost was to determine if there are associations between the strength of business and social ties and the sharing of different types of knowledge. The second purpose was to find out which of the two dimensions–closeness of

relationship or the frequency of interaction –serves as a stronger predictor for the sharing of the four different kinds of knowledge identified in this study.

6.2.1 Methodological Issues

This research has introduced a new configuration for strength of ties –the independent variable for this study –that permitted detailed analysis from a fresh perspective. Likewise, four types of knowledge are defined in an innovative way that also breaks away from the traditional dichotomy.

6.2.1.1 Strength of Ties Earlier studies investigated how strength of ties in general were related to knowledge sharing (Hansen, 1999, Reagans & McEvily, 2003). This study does not use *strength of ties* the way the term has been used in previous studies. Rather, it breaks down each of the two ties into two further divisions. First, strength of business ties–formal by its nature–has been divided into two types, based on closeness and frequency of interaction. Likewise, strength of social ties–informal in its orientation–is divided into two types, again based on closeness and frequency of interaction. This classification of ties furnishes new insights into the relevance of the two types of ties as predictors of knowledge-sharing between units within an organization.

6.2.1.2 Knowledge Classification Another important methodological issue is in the dimension of codification. Previous research in knowledge sharing focused on and addressed the codification issue as a primary facilitator or inhibitor to knowledge sharing. This study presumed that the codification issue alone does not reflect all dimensions or traits of knowledge and how people react to them. Therefore, this study has taken a step forward and adds two

specific categories of knowledge to the codification dimension by asking whether employees perceive knowledge as "private" or, in other words, whether the knowledge belongs to them or whether it is "public" (*i.e.*, it belongs to the organization). To classify types of knowledge, the researcher created the distinction between public and private knowledge and merged that distinction with the traditional classification of codified and noncodified for each. Compared with the traditional categorizations of codified versus noncodified knowledge, these distinctions appear better suited for understanding knowledge sharing in business organizations. This is because they deal with the characteristics of knowledge that reflect realistic internal issues and problems of knowledge access and knowledge hoarding in a business environment.

This study attempts to generate new insights concerning the effects of the tie-strength on knowledge sharing by using new variable configurations and dichotomies. This is, in part, a response to the call of Raider & Krackhardt (1994) concerning how current research needs to be expanded to be more specific from a social networking perspective.

6.3 FINDINGS

Two principal hypotheses were formulated for this study (see Chapter Five). Both these hypotheses have been partially supported. Results for the first hypothesis have indicated that certain types of ties significantly predict the sharing of certain types of knowledge, whereas no such prediction potential can be established for other formulations. The test of the second hypothesis shows that the dimension of closeness is a stronger predictor than the frequency of interaction in the sharing of public codified knowledge and private noncodified knowledge.

In the following sections the presence or absence of these patterns of significance, and the other findings of the study, are examined in the context of the organization in which this study took place. The findings are explained based on the results of the research, interviews with employees and managers in the bank, and opinions and results of other research offered in the literature. The limitations of the study are discussed later in the chapter.

Figure 6.1 serves as a visual map in understanding these findings and what might have contributed to their making.

6.3.1 Significance of the Business Relationship for Knowledge Sharing

The testing of the first hypothesis established that the strength of business relationships, in comparison with the strength of social relationships, contributes more significantly to the sharing of public and private knowledge. This finding points to the significant dominance of business relationships over social relationships as it is related to the sharing of knowledge in this setting. What underpins these patterns is that the working relationships, whether in the form of frequency of interaction or closeness, were found to be much denser. The graphic images in Chapter 5 illustrates this point (see **Figure 5.1**-**Figure 5.4**). These images show that the density of business relationships was 69%, whereas the density of social interactions was only 24%. Likewise, some 63% of the ties were described as close in business relationships, compared with 35% of the ties described as close in social relationships.

The above finding pointed the researcher to the need to examine the organizational practices and situational realities within the organizational setting of IMFC to reveal useful insights that could explain these interesting patterns. Seeking to gain a better understanding of the context, the researcher interviewed four managers and three employees. These extensive interviews were

unstructured. The researcher sought explanations about the possible factors behind the presence of strong formal connections and weak informal channels of sharing between employees. These discussions produced interesting insights that deserve the further attention of researchers and academicians. The central focus of the interviews was the structure of IMFC, specifically, its coordination mechanisms and how these mechanisms shed light on the findings of this study. This is because the structure of coordination determines the organization's capability to mobilize and integrate different types of knowledge (Lam, 2000).

Figure 5.4-Figure 5.8 in Chapter Five shows that knowledge sharing flows horizontally, mostly through working ties between the twenty-two units. There was a need to make sense out of this situation and to understand why the employees in these units are not as well connected socially as they are in their formal working connections. The precise reasons relating to the research setting at IMFC have to be examined so that the survey findings can be interpreted in a plausible manner. A number of relevant situational realities observed in the particular organizational setting of IMFC have been put forward for this purpose.

6.3.1.1 Organizational Structure Organizational coordination refers to integrating or linking together different parts of the organization (Van de Ven, 1976). Given that diverse knowledge is embedded in different units, the way the firm coordinates different units greatly affects the pattern of intra-organizational knowledge sharing (Grant, 1996). The existing literature on organizational coordination (Martinez & Jarillo, 1989, Ghoshal, Korine & Szulanski, 1994) suggests two generic types of coordination: (1) formal hierarchical structure, and (2) informal lateral relations.

Formal hierarchical structure is one way to coordinate a complex system comprised of multiple specialized units. Previous research has identified some key elements of a formal structure, notably centralization and specialization (Van de Ven, 1976, Miller & Droge, 1986).

The interviews verified that IMFC has a centralized. formal hierarchical structure. Its internal organization is built primarily upon the centralization of authority. Coordination is achieved through vertically imposed bureaucratic processes. Centralization determines whether the locus of decision making lies at the higher or lower levels of a hierarchical relationship.

It became clear that strategic decision-making in this organization is primarily dictated by the managing director and the heads of groups. Decisions concerning functional matters are made by the heads of groups and senior managers who meet regularly twice a week to discuss various issues concerning each unit and determine strategic directions.

The findings suggest that the mechanism of coordination at IMFC seems to work in favor of working connectivity and knowledge sharing. From an information processing perspective, centralization is likely to have a positive effect on intra-firm knowledge sharing because "centralization provides coordination and integration across the interdependency" (Egelhoff, 1982). The interviews revealed that this is so because heads of groups and senior mangers appear to exert pressure on employees to share knowledge to accomplish their work.

More than one of the employees mentioned that their mangers usually reminded them to keep all communication channels open with different units and not to hesitate to ask for needed knowledge when appropriate. The reason behind this is that their action will be reciprocated at some future time. This reality seems to reflect what is known as the "knowledge market" (Cohen & Prusak, 2001). Prusak argued for the recognition that there are knowledge "buyers and sellers," each of whom expects to gain something in a knowledge transaction.

This belief is mirrored at IMFC in the many exchange relationships between different units. Exchange relationships develop from a series of mutual exchanges between two entities until a time whereby mutual exchanges became normative behavior (Rousseau, 1989). Moreover, even if employees prefer not to share, the complexities of their work lead them to consult with a large network that may involve units from many diverse groups.

Centralization as a coordinating mechanism does have a positive effect on knowledge sharing at IMFC. Nevertheless, much current research has focused on informal relations and decentralization as a mechanism for sharing knowledge (Tsai, 2000, Chang & Harrington, 2003). The reason for this is largely because innovation and the creation of new knowledge are now receiving more attention in organizations because of the rising pressures of increased competition. Using formal hierarchy as the coordinating mechanism leads to the sharing of unstructured knowledge for the sake of near-term gains as opposed to long-term gains. Unstructured types of knowledge sharing, which are naturally stimulated without systematic mechanisms or overt intervention from the organization, are often representative of actual day-to-day practices and are part of the work flow between individuals in different units. By contrast the structured forms are more likely to lead to collective knowledge and organizational learning.

A learning organization is an organization skilled at creating, acquiring, and transferring knowledge and at modifying its behavior to reflect new knowledge and insights (Garvin, 1993). Companies that qualify as learning organizations *actively manage* the learning process to ensure that it occurs by design rather than by chance. One way of doing so is designing a workplace learning, where the central issue in learning is becoming a practitioner and not learning about practice. Learning by doing in the context of the community where learning takes place is

crucial. Mentoring, coaching, team and work groups are different mechanisms of implementing this strategy (Brown & Duguid, 2000).

At IMFC, knowledge sharing is unstructured; in other words, there is no systematic learning that takes place between groups. Rather, there is only fragmented individual learning occurring. This may well have costs in terms of time, money and competitive advantage, especially as foreign banks will be increasingly entering the local market in a few years. In addition, in firms with hierarchical control, noises from below *(i.e.,* from those who are on the front line and have the most insight and experience) are often not heard "up there." Such local insights are too valuable for a firm's competitive advantage to go unheard or be "lost."

6.3.1.2 Management Style Employees at IMFC share knowledge among themselves because of a demanding management which expects that all work must be done well and be error free. No manager expects "I don't know" for an answer, even if it isn't in the employee's primary working domain. The employee then has to find answers from other parts of the bank to satisfy the manager's enquiries. Furthermore, even if employees have done really well in their previous work, one mistake can cause them to be labeled as "incompetent" or "dumb." Employees recounted that this happens in public, sometimes in front of their colleagues in the unit. So, trying both to avoid public humiliation and to do their job as well as possible, IMFC employees rely on their established networks across the bank. Therefore, it is not a matter of choosing or liking to share so much as having to share knowledge. IMFC management's very high expectations of its employees makes knowledge sharing become a part of the management value: "No tolerance for mistakes." As a result, employees have to rely a great deal on their networks to try to avoid making mistakes.

This management style, however, appears to discourage innovation, creative thinking, and collective knowledge and group learning. None of the bankers wants to be in the hot spotlight, no matter how great they think their ideas are. No one ever risks revealing his mistakes if that can be avoided. This situation undervalues and even wastes human resources at IMFC. One manager commented that "we mostly have soldiers here and no thinkers!" Consequently, IMFC relies on outside consultants more and more. That strategy has proven to be quite expensive and has shown little or no return to the organization according to the unanimous opinion of employees interviewed. It also has had the effect of creating a certain cynicism among employees, and of depressing morale.

Management style creates and reflects the corporate culture which, in turn, is embedded in all organizational behavior. Culture is expressed in the way people act, what they expect from each other, and how they make sense of each other's actions (McDermott & O'Dell, 2001). Reading and assessing corporate culture is never easy because it occurs at multiple levels. Schein (1985) defined culture as the shared values, beliefs, and practices of the people in the organization. The most obvious place to begin understanding an organization's culture is to read the espoused mission, philosophy, and values. Such statements usually say something about the culture, even if they are more aspiration than reality. IMFC's five S's values are: (1) superior returns for shareholders; (2) strong dedication to customers; (3)social responsibility within the community; (4) serious commitment to staff development and welfare; and (5) striving always to improve.

A close look at these values explains some of the pressures management puts on employees. The bank is intent on sustaining a competitive position and providing a good return to its shareholders and good service to its customers. Nevertheless, it lacks a real and serious commitment to its staff in terms of merit promotion, training, and an equitable and fair system of

rewards. For example, interviews with employees revealed their sense of the unfairness of the training system which is perceived to favor mainly employees from specific nationalities while totally ignoring others. The bank's reward system is less generous than employees feel they deserve in return for their efforts and hard work. Accordingly, many employees are receptive to offers of better salaries elsewhere. This explains much of the high turnover and low retention rates reported at IMFC by the interviewees.

Physical structures, like buildings, décor, and office layout can also reflect cultural assumptions (Martin & Siehl, 1983). The main executive offices are located on the top floor of a huge headquarters building. The décor on this floor is much more elegant than other floors. This visually reflects a value of paying deference to the top corporate management and emphasizes the hierarchical structure of the bank.

A number of studies have identified a variety of organizational cultures, each using different terminologies and methods to describe seemingly similar concepts. One study consolidated some of this research using factor analysis (Xeniko & Furnham, 1996). The researchers identified four basic organizational cultures, each having its unique characteristics: (1) Openness to change/Innovative; (2) Task oriented; (3) Bureaucratic; (4) Competitive.

It is difficult to identify exactly under which of the previous four categories the culture of IMFC might be placed as we have no reliable measure to do that. Yet, from all indications it can be said that IMFC exhibits some combination of a task oriented and bureaucratic culture. Certainly from the perspective of its employees it does not seem to be an environment that consistently nurtures either innovation or loyalty. Unfortunately, in the increasingly competitive environment it faces, IMFC seems to be fostering an inappropriate set of cultural characteristics which may fatally weaken its position in the local market over time.

6.3.1.3 Conditions of Uncertainty Conditions of internal uncertainty at IMFC play a large role in initiating unstructured knowledge sharing between units. Uncertainty here is defined as: "Imprecision in estimates of future consequences conditional on present actions" (March, 1994). Within a financial institution, conditions of uncertainty arise mainly from the necessity for total accuracy in all transactions. Any mistakes can be very costly; hence there is "zero tolerance" for mistakes.

Organizations that find themselves in a specific but temporary crisis situation are sometimes also characterized by unstructured exchanges of knowledge. Here, the feeling of "needing each other" is stimulated. The launching stage of an organization is one example of such a situation; another is when an organization is threatened with bankruptcy. In both situations knowledge sharing is naturally stimulated, *i.e.*, it is unstructured. Within IMFC there is an almost constant sense of crisis within one or another part of the organization due to the nature of the constant risks of handling money, that of the clients and that of the bank itself. This low-grade "fever" permeates. IMFC and contributes to the "culture" of ongoing unstructured exchanges of knowledge. This study's findings support the earlier results of Mizruchi & Stearns (2001) in which they argue that, in organizations with high levels of uncertainty, employees heavily rely on social networks for accomplishing their work.

These three factors, the organizational structure in the form of centralization, the management style, and the conditions of uncertainty have led to unstructured horizontal sharing of knowledge between units at IMFC**.** If the leadership of this organization wants to reap the fruits from knowledge sharing practices, that is to say, if it wishes to learn from the knowledge present in the organization, then it needs to do more than simply adapt to existing or present needs.The lack of structured managerial or organizational involvement in knowledge sharing leads to the

enhancement of learning by individual employees but not to meaningful organizational learning. This lack could cause IMFC to lose its competitive edge in the future. Structured knowledge sharing is now beginning to be recognized as having crucial importance. Many organizations are now addressing the issue of knowledge sharing as they gain a growing awareness of its benefits in creating value. Its substantial impact is evident from Chevron's $200 million reduction in annual energy expenses; the sales turnaround at Nippon Roche; Buckman Laboratory's gain in sales due to new products; and Xerox's $11 million a year gain from sharing knowledge through Eureka (O'Dell & Grayson, 1998). Figures like these do not really capture the true value of sharing knowledge. General Electric's CEO Jack Welch asserted that GE's global status was primarily due to its ability to share and leverage expertise (Stewart, 2001).

6.3.2 Sharing of Different Kinds of Knowledge

6.3.2.1 Public Non-codified Knowledge Public noncodified knowledge was found to be the *most shared* knowledge within IMFC because:

- It is not complex knowledge, *i.e*. it's easy to explain;
- No shared context is required for comprehension;
- There is no feeling of ownership of it;
- It is not particularly sensitive or confidential in most respects.

The dimension of frequency of interaction predicted the sharing of public noncodified knowledge. This supports earlier research done by Granovetter (1973) who found that job seekers typically discover novel public knowledge through acquaintances rather than close ties. The reason behind that is that generally people with close knit networks know the same things and same people. They won't be of great assistance when it comes to knowing who might have

new knowledge or skills other than within the circle of people whom the seeker also already knows. In other words, broad acquaintance provides a wider circle of potential knowledge than a closer tie would likely offer.

6.3.2.2 Private Noncodified Knowledge The dimension of closeness of working relationship predicted the sharing of private noncodified knowledge. The significance of closeness of ties as a predictor is discussed later. See section 6.3.3.

Most researchers and practitioners believe that private noncodified knowledge is the most valuable knowledge in term of its uniqueness and value for innovation. The sharing of private noncodified knowledge, however, was found to be the *least* shared knowledge among the four types at IMFC. This kind of knowledge is shared face to face so it needs a coordinating mechanism to create informal social opportunities and functions for employees to build trust and develop caring relationships to enable the exchange of this kind of knowledge. This does not seem to be the case at IMFC.

This might be due to the lack of coordination mechanisms that promote more social informal interactions among employees from different units. For example, there are no set lunch breaks at IMFC. Every employee just grabs something from the cafeteria whenever time permits. There are no other natural social outlets such as water coolers, coffee stands, etc. There is a Starbucks stand in the cafeteria, but employees were observed to seek waiter assistance for service. Even the design and physical layout of the cafeteria discourages social mingling and casual chats.

Organized informal social events outside the bank are not always popular. Many of them are restricted to employees only, without inviting their spouses or families. Others are held at inconvenient times. Most of these events are not attended by the executives or senior managers. This naturally discourages other employees from attending.

Lack of dense informal ties is a result of a low care environment. Von Krogh (1998) states that in low care situations individuals exert a maximum grip on their tacit knowledge, seizing what they need and hoarding what they have. Their research suggests that low-care groups strive for minimum risk, transacting exchanges of knowledge only when they calculate that the probable benefits outweigh the probable costs. Within IMFC it appears that management is not exerting enough time and money to build informal ties among employees across different units and in creating and sending caring signals to its employees. This results in less trusting relationships, which in turn, undermines the basis for the sharing of private noncodified knowledge.

6.3.2.3 The Division of Noncodified Knowledge into Public and Private Public noncodified knowledge and private noncodified knowledge are cited as the most and least shared knowledge respectively within IMFC.Dichotomizing noncodified knowledge into public and private made eminent sense. Although both the "public" and the "private" are noncodified knowledge, the frequency of working interaction predicted the sharing of public noncodified knowledge in this context, while the closeness of working relationship predicted the sharing of private noncodified knowledge. This is due to the attitudes bankers have towards these two kinds of knowledge. One widespread norm that contributes to knowledge sharing is the idea that organizations own the labor of their employees (Feldman & March, 1981). Kelly & Thibaut (1991) suggest that knowledge embodied in a work product is more likely to be considered the property of the organization, while employees view their expertise, or "private" knowledge as part of themselves and not simply a commodity (Drucker, 2002). Hence, expertise more directly reflects their identity and self worth. Accordingly, sharing expertise, in other words "private

knowledge," will have not only pragmatic implications but also implications for the expression and consistency of the possessor's identity and value.

Organizations do not 'own' their employees, of course, and because expertise is an aspect of the individual person, ownership of expertise is problematic. Unless a contract states otherwise, a person can quit a job and employ his expertise elsewhere. Nonetheless, mangers generally seem to expect that expertise gained at work or with organizational resources should be shared with other employees and used for the benefit of the organization, just as other kinds of knowledge are shared and used. The results of the survey and interviews with IMFC's managers and bankers actually confirmed that people think about knowledge products and expertise differently. Sharing each has a different basis and seems to occupy different dimensions in the minds of IMFC employees. Whereas people would share a computer program because the organization has the right to it, they would share expertise because doing so has personal benefits.

6.3.2.4 Public Codified Knowledge vs. Private Codified Knowledge The closeness of working ties predicted the sharing of *public codified knowledge* because of the nature of the IMFC environment in terms of confidentiality and its policies on the sharing of such documents between units. While the dimension of closeness predicted the sharing of most kinds of knowledge, it did not predict the sharing of *private codified knowledge*. Neither did any other kind of tie. Moreover, in this instance, the R-square was very low=.007 (see Chapter 5).

This finding draws attention to the fact that large parts of human knowledge, such as skills, techniques and know-how *(i.e.* private noncodified knowledge) cannot be easily articulated or communicated in codified forms. Knowledge of this kind is experience based, and it can be revealed only through practice in a particular context and transmitted through socializing because

it may be too difficult to explain, too changeable, too contextually specific or too politically sensitive. Most information systems have failed to capture the private knowledge that companies were striving to collect even though such expertise is so crucial for innovation. There is now a growing realization that this type of knowledge cannot be codified and can be shared only through face-to-face interactions (Bansler & Havn, 2003; Butler, 2003).

6.3.3 Significance of Closeness of Ties

The testing of the second hypothesis of the study established that closeness in strength of ties is a stronger predictor than frequency of interaction in the sharing of public codified knowledge and private noncodified knowledge.

The closeness of ties or emotional intimacy (Granovetter, 1973) is a strong predictor of sharing of knowledge in cases of uncertainty because of the element of trust and because of the motivation to treat another person in positive ways or at least not to do something that would hurt him (Krackhardt, 1992). When uncertainties are high, IMFC's bankers seek out people with whom they are closely tied and whom they trust. This is especially so when the knowledge they are sharing is confidential and restricted to certain levels and groups, as is the public codified knowledge at IMFC. Uncertainties create conditions that trigger a desire for the familiar, and bankers respond by turning to those with whom they are close. The conditions of uncertainty in the study were discussed under the previous finding.

Trust is an expectation that alleviates the fear that one's exchange partner will act opportunistically (Bradach & Eccles, 1989). Additionally, trust is a set of expectations that tasks will be reliably accomplished (Sitkin & Roth, 1993). Trust concerns both the receipt of and the dissemination of knowledge. If individuals do not trust the knowledge they are receiving they

are obviously unlikely to make full use of it. Conversely, individuals will resist sharing if they do not trust the people to whom they are imparting knowledge to use it wisely or keep company secrets or respect appropriate confidentiality.

Mutual trust brings groups closer together. Empirical evidence of this phenomenon was demonstrated in a series of controlled studies of camping groups in which competing teams developed trust relationships. This was followed by a sharing of knowledge on solving a common problem (Sherif, 1966). Emotional attachment in the form of closeness also has an element of *care*, which gives rise to trust, active empathy, access to help, lenience in judgment, and courage. Several studies have demonstrated that, among intimates, the most intimate tie has provided more support than it has among those who are somewhat less intimately attached (Fischer, 1982, Williamson, 1975). The finding that closeness of ties is a stronger predictor of the sharing of more kinds of knowledge aligns this study's results with Lee (1994) findings that the frequency of communication between individuals does not facilitate information transmission, but that the "kind of person(s)" involved and the quality of their relationships may be considerably more important."

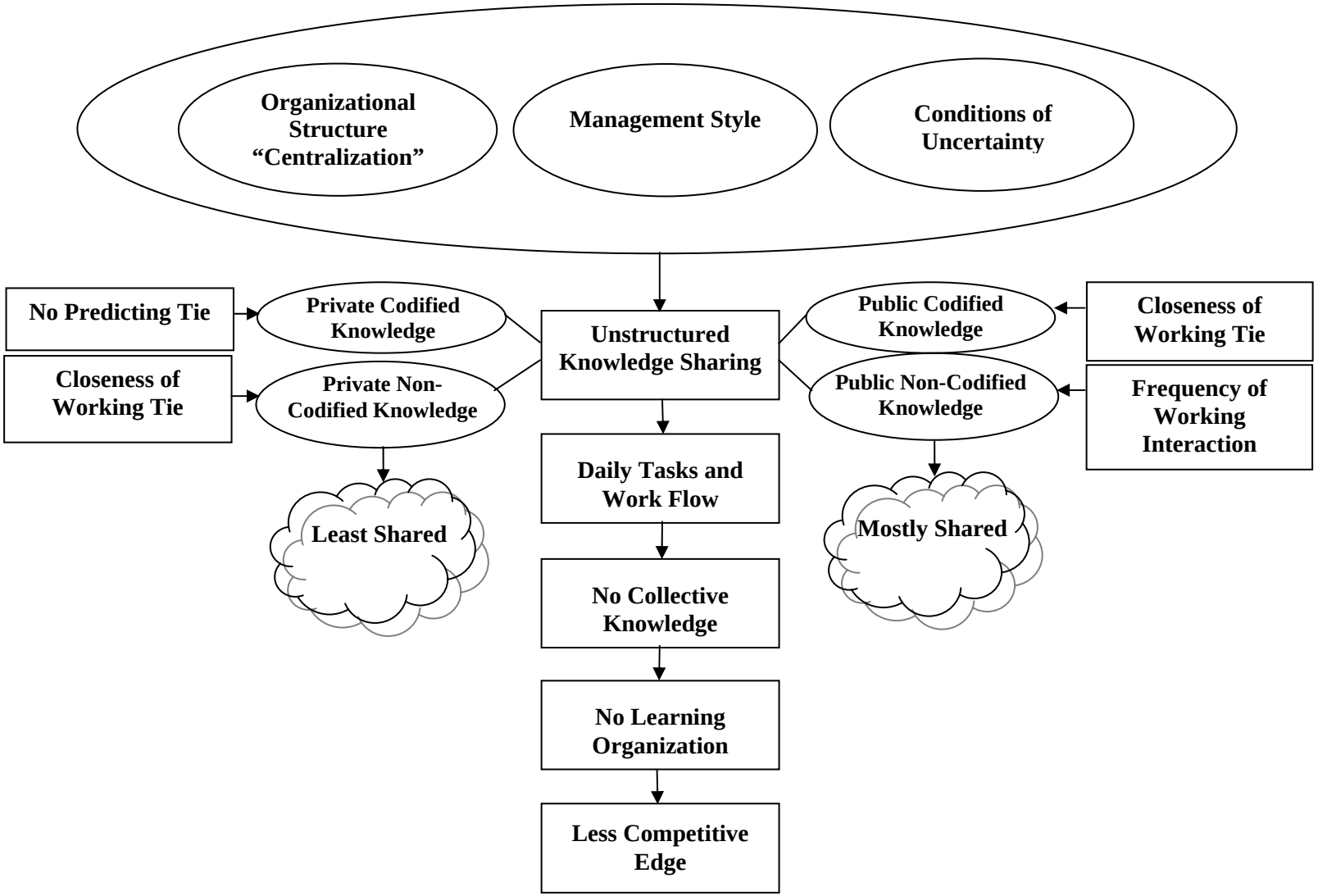

Figure 6.1: Map of the Findings

6.4 LIMITATIONS OF THE STUDY

This study was conducted using standard procedures for SNA studies. A number of limitations, however, are noted for this study:

- One organization belonging to a certain type of business was studied, and these results might be more relevant in the setting of similar business organizations that have similarities in their contexts and profiles with this organization.
- For the purpose of data collection, a one-site sampling scheme was applied in this study, which is common in social network research. It is apparent that the findings, however, are not generalizable universally. Findings can be applied elsewhere with prudence and caution.
- The model used in this study did not include the performance aspect of the organization. Adding this segment might make the results more meaningful. Yet practical limitations of researcher in terms of time, effort and resources did not permit adding this component to the model.
- All information used in the study was gathered through one survey instrument completed by respondents. Thus the limitation of common-method bias and self-report bias apply to this study to a certain degree, again quite typical for such studies.
- Small number of units.

6.5 RECOMMENDATIONS FOR FUTURE RESEARCH

A number of recommendations, which follow from this initial study, are made below for future research:

- The study could be extended to different context, in which social ties are as dense as working ties or in which social ties are denser than working ties so that broad comparison studies regarding the domination of one type of tie on the others could be developed.
- Other similar studies need to be conducted in other industrial/business settings. Situational variations might bring forth new dimensions that need to be examined critically before any generalizations can be made in definite terms.
- This study might be replicated in multiple organizations in similar settings. To enhance the quality and reliability of the findings of this study
- A larger study might be conducted by adding the parameter of performance to the model to enhance our understanding and make it much more meaningful for enterprises.
- There is a need to study the effect of the two dimensions of tie strength-frequency of interaction and closeness on knowledge sharing separately in different contexts.
- There appears to be a strong need to conduct a study that might investigate correlation between closeness and trust.
- An investigation into the micro-structure of the data in this study could be examined; i.e. looking at the formation of cliques, position of the units and how these affect the sharing of knowledge.

6.6 RECOMMENDATIONS FOR PRACTITIONERS

Several thought-provoking recommendations have come out of this work, particularly for the firm involved in the study. If the management is keen to leverage knowledge to have a competitive edge, it might consider a number of initiatives that can bring significant dividends to the organization. A few recommendations are:

- The management might use strategies like fostering access to and membership of community of practice (Brown & Duguid, 2000) that could help in turning the firm into a learning organization. Accordingly, this will help the firm in developing crucial social capital that is needed to adapt to the challenges of increasingly competitive markets (Drucker, 2002).
- The management might consider pursuing knowledge management as a strategic initiative. This can be done by a conscious strategy of getting the right knowledge to the right people at the right time. Some steps that can help in implementing this strategy are:
    - Identification of important knowledge within the organization;
    - Creating space and system for people to share;
    - Capturing, Collecting and managing best practices that can be used/reused; and
    - Providing channels of communication either socially or electronically for knowledge sharing to take place (O'Dell, 2004).
- The management might make structured efforts to manage knowledge sharing flows. Strategies such as mentoring, coaching and job rotation might help in creating the foundation for collective knowledge.
- This firm needs to employ more informal coordination mechanisms like informal lunches, picnics, sporting events and occasional informal retreats to enhance horizontal

informal interactions between employees of different units. These interactions are crucial in building relationships based on trust and care, which might lead to more sharing of private noncodified knowledge, most crucial intellectual capital asset for any firm .

- Another step that the firm can take to encourage and enhance social interactions among employees and to decrease hierarchical differences is attention to the physical layout of the facilities and traffic flows which might cost little but it might have long-term benefits.

6.7 CONCLUDING REMARK

Understanding knowledge sharing from a social network perspective is both beneficial and important because it provides a set of tools and a visualization of networks that allows better understanding and certain interventions if needed. Networks don't exist in a bubble by themselves. Elements including organizational structure, management style, and conditions within the organizational context played a big role in this study in discovering who shared knowledge with whom and for what purposes. The same factors had a critical role in making working relationship a dominant predictor of sharing of most kinds of knowledge as compared to social relationships in this study.Focusing on the formal hierarchical structure as a coordinating mechanism while ignoring the informal lateral relations seems to minimize the sharing of private noncodified knowledge. Yet this is the type of knowledge that most researchers and practitioners believe is the most valuable knowledge in term of its uniqueness and its value for innovation (Nonaka, 1991; Cohen & Prusak, 2001).

Trust, motivation, and care are some of what closeness of ties represent. These create a context and situations in which barriers between the self and others are removed and in which

social interactions encourage the sharing and exploration of ideas and knowledge that can generate new concepts and productive innovations.

APPENDIX A

BREAKDOWN OF RESPONSE RATES FROM IMFC'S TWENTY TWO UNITS

Table A.1: Breakdown of Response Rates from IMFC'S Twenty Two Units

Group/Division	Total	Responded	% Responded
Administration support unit	52	8	15
Brokerage unit	31	26	84
Collection unit	30	8	27
Customer help line unit	117	55	47
Credit cards unit	57	18	32
Credit unit	27	6	22
Business unit	55	12	22
Consumer sales unit	22	2	9
Branches unit	331	58	18
Local loans unit	21	15	71
Accounting unit	33	18	55
HR unit	33	10	30
Internal audit unit	16	6	38
Internet unit	8	6	75
IT unit	124	46	37
Legal unit	27	10	37
Sales unit	37	21	57
Operations unit	125	57	46
VIP unit	51	28	55
Loss control unit	5	2	40
Finance unit	48	9	19
Treasury unit	21	17	81

APPENDIX B

COVER LETTER AND SURVEY INSTRUMENT

Business and Personal Ties and
Organizational Knowledge Sharing

Dear Respondent,

I am a doctoral candidate enrolled in the School of Information Sciences at the University of Pittsburgh. My research focus is knowledge management.

The primary purpose of this study is to understand patterns of association between the strength of your business and personal relationships with employees in different parts of the organization and the types of knowledge you share through these ties.

Participants in this study include IMFC employees who are based in [redacted]. Conclusions will be shared with IMFC management to enhance connectivity and knowledge sharing between areas. Accordingly, this will help employees in making better decisions and solving problems in a timely manner.

I request your cooperation and honest response in completing a brief 10 minutes online survey. Please be assured your responses are – and will always remain – completely anonymous. I fully respect the privacy of all participants, and in no way will your imput be identified at an individual level. In addition, all responses will be automatically stored on a server at the University of Pittsburgh and will be used for scholarly research purposes only. Your participation is completely voluntary.

Your responses are of the greatest importance to the success of this study. Thank you in advance for your participation. It is a privilege to work with you on this project.

Sincerely,

Laila Marouf
PhD Candidate
School of Information Sciences, University of Pittsburgh

Please Click Here to Begin Survey

Survey Instrument

Please mark the unit you belong to:

- ( ) VIP Unit
- ( ) Customer Help Line Unit
- ( ) Branches Unit
- ( ) Internet Unit
- ( ) Consumer Sales Unit
- ( ) Credit Unit
- ( ) Sales Unit
- ( ) Credit Cards Unit
- ( ) Treasury Unit
- ( ) Brokerage Unit
- ( ) Finance Unit
- ( ) Business Unit
- ( ) IT Unit
- ( ) Accounting Unit
- ( ) Operations Unit
- ( ) Local Loans Unit
- ( ) Loss Control Unit
- ( ) Legal Unit
- ( ) Collection Unit
- ( ) Human Resources Unit
- ( ) Administrative Support Unit
- ( ) Internal Audit Unit

1. On average, how **frequently** do you interact with employees of the following units for **accomplishing your work**?

0 never
1 once every few months
2 once a month
3 once a week
4 twice a week
5 daily

	never	once every few months	once a month	once a week	twice a week	daily
VIP Unit	**0**	1	2	3	4	5
Business Unit	**0**	1	2	3	4	5
Customer Help Line Unit	**0**	1	2	3	4	5
IT Unit	**0**	1	2	3	4	5
Branches Unit	**0**	1	2	3	4	5
Accounting Unit	**0**	1	2	3	4	5
Internet Unit	**0**	1	2	3	4	5
Operations Unit	**0**	1	2	3	4	5
Consumer Sales Unit	**0**	1	2	3	4	5
Local Loans Unit	**0**	1	2	3	4	5
Credit Unit	**0**	1	2	3	4	5
Loss Control Unit	**0**	1	2	3	4	5
Sales Unit	**0**	1	2	3	4	5
Legal Unit	**0**	1	2	3	4	5
Credit Cards Unit	**0**	1	2	3	4	5
Collection Unit	**0**	1	2	3	4	5
Treasury Unit	**0**	1	2	3	4	5
Human Resources Unit	**0**	1	2	3	4	5
Brokerage Unit	**0**	1	2	3	4	5
Administrative Support Unit	**0**	1	2	3	4	5
Finance Unit	**0**	1	2	3	4	5
Internal Audit Unit	**0**	1	2	3	4	5

2. How do you **describe** your **working relationship** with employees of the following units?

0 no relationship
1 distant (formal, impersonal, reserved)
2 not so close (restrained in discussions)
3 somewhat close (discussing and solving issues together)
4 close (comfortable to approach and discuss)
5 very close (very friendly, great deal of mutual trust)

	no rela-tionship	distant	not so close	somewhat close	close	very close
VIP Unit	**0**	1	2	3	4	5
Business Unit	**0**	1	2	3	4	5
Customer Help Line Unit	**0**	1	2	3	4	5
IT Unit	**0**	1	2	3	4	5
Branches Unit	**0**	1	2	3	4	5
Accounting Unit	**0**	1	2	3	4	5
Internet Unit	**0**	1	2	3	4	5
Operations Unit	**0**	1	2	3	4	5
Consumer Sales Unit	**0**	1	2	3	4	5
Local Loans Unit	**0**	1	2	3	4	5
Credit Unit	**0**	1	2	3	4	5
Loss Control Unit	**0**	1	2	3	4	5
Sales Unit	**0**	1	2	3	4	5
Legal Unit	**0**	1	2	3	4	5
Credit Cards Unit	**0**	1	2	3	4	5
Collection Unit	**0**	1	2	3	4	5
Treasury Unit	**0**	1	2	3	4	5
Human Resources Unit	**0**	1	2	3	4	5
Brokerage Unit	**0**	1	2	3	4	5
Administrative Support Unit	**0**	1	2	3	4	5
Finance Unit	**0**	1	2	3	4	5
Internal Audit Unit	**0**	1	2	3	4	5

3. On average, how **often** do you **socialize** with one or more employee(s) of the following units over coffee breaks, lunches, dinners, etc. inside and outside [redacted]?

0 never
1 once every few months
2 once a month
3 once a week
4 twice a week
5 daily

	never	once every few months	once a month	once a week	twice a week	daily
VIP Unit	**0**	1	2	3	4	5
Business Unit	**0**	1	2	3	4	5
Customer Help Line Unit	**0**	1	2	3	4	5
IT Unit	**0**	1	2	3	4	5
Branches Unit	**0**	1	2	3	4	5
Accounting Unit	**0**	1	2	3	4	5
Internet Unit	**0**	1	2	3	4	5
Operations Unit	**0**	1	2	3	4	5
Consumer Sales Unit	**0**	1	2	3	4	5
Local Loans Unit	**0**	1	2	3	4	5
Credit Unit	**0**	1	2	3	4	5
Loss Control Unit	**0**	1	2	3	4	5
Sales Unit	**0**	1	2	3	4	5
Legal Unit	**0**	1	2	3	4	5
Credit Cards Unit	**0**	1	2	3	4	5
Collection Unit	**0**	1	2	3	4	5
Treasury Unit	**0**	1	2	3	4	5
Human Resources Unit	**0**	1	2	3	4	5
Brokerage Unit	**0**	1	2	3	4	5
Administrative Support Unit	**0**	1	2	3	4	5
Finance Unit	**0**	1	2	3	4	5
Internal Audit Unit	**0**	1	2	3	4	5

4. Keeping in view your answer to Q3, how do you **describe** your **social relationship** with employees of the following units?

0 no relationship
1 distant (formal, impersonal, reserved)
2. not so close (restrained in discussions)
3. somewhat close (acquaintance)
4. close (comfortable to approach and discuss)
5. extremely close (very friendly, great deal of mutual trust)

	no rela-tionship	distant	not so close	somewhat close	close	very close
VIP Unit	**0**	1	2	3	4	5
Business Unit	**0**	1	2	3	4	5
Customer Help Line Unit	**0**	1	2	3	4	5
IT Unit	**0**	1	2	3	4	5
Branches Unit	**0**	1	2	3	4	5
Accounting Unit	**0**	1	2	3	4	5
Internet Unit	**0**	1	2	3	4	5
Operations Unit	**0**	1	2	3	4	5
Consumer Sales Unit	**0**	1	2	3	4	5
Local Loans Unit	**0**	1	2	3	4	5
Credit Unit	**0**	1	2	3	4	5
Loss Control Unit	**0**	1	2	3	4	5
Sales Unit	**0**	1	2	3	4	5
Legal Unit	**0**	1	2	3	4	5
Credit Cards Unit	**0**	1	2	3	4	5
Collection Unit	**0**	1	2	3	4	5
Treasury Unit	**0**	1	2	3	4	5
Human Resources Unit	**0**	1	2	3	4	5
Brokerage Unit	**0**	1	2	3	4	5
Administrative Support Unit	**0**	1	2	3	4	5
Finance Unit	**0**	1	2	3	4	5
Internal Audit Unit	**0**	1	2	3	4	5

5. Think of an occasion when you needed someone who has a certain skill to assist you with your job. How **often** did you contact employees of the following units **to refer you to the correct resource person?**

0 never
1 once every few months
2 once a month
3 once a week
4 twice a week
5 daily

	never	once every few months	once a month	once a week	twice a week	daily
VIP Unit	**0**	1	2	3	4	5
Business Unit	**0**	1	2	3	4	5
Customer Help Line Unit	**0**	1	2	3	4	5
IT Unit	**0**	1	2	3	4	5
Branches Unit	**0**	1	2	3	4	5
Accounting Unit	**0**	1	2	3	4	5
Internet Unit	**0**	1	2	3	4	5
Operations Unit	**0**	1	2	3	4	5
Consumer Sales Unit	**0**	1	2	3	4	5
Local Loans Unit	**0**	1	2	3	4	5
Credit Unit	**0**	1	2	3	4	5
Loss Control Unit	**0**	1	2	3	4	5
Sales Unit	**0**	1	2	3	4	5
Legal Unit	**0**	1	2	3	4	5
Credit Cards Unit	**0**	1	2	3	4	5
Collection Unit	**0**	1	2	3	4	5
Treasury Unit	**0**	1	2	3	4	5
Human Resources Unit	**0**	1	2	3	4	5
Brokerage Unit	**0**	1	2	3	4	5
Administrative Support Unit	**0**	1	2	3	4	5
Finance Unit	**0**	1	2	3	4	5
Internal Audit Unit	**0**	1	2	3	4	5

6. How **often** do you exchange **Bank memos, reports, manuals, financial statement** available in hard copy or soft copy (e-mail) with employees of the following units?

0 never
1 once every few months
2 once a month
3 once a week
4 twice a week
5 daily

	never	once every few months	once a month	once a week	twice a week	daily
VIP Unit	**0**	1	2	3	4	5
Business Unit	**0**	1	2	3	4	5
Customer Help Line Unit	**0**	1	2	3	4	5
IT Unit	**0**	1	2	3	4	5
Branches Unit	**0**	1	2	3	4	5
Accounting Unit	**0**	1	2	3	4	5
Internet Unit	**0**	1	2	3	4	5
Operations Unit	**0**	1	2	3	4	5
Consumer Sales Unit	**0**	1	2	3	4	5
Local Loans Unit	**0**	1	2	3	4	5
Credit Unit	**0**	1	2	3	4	5
Loss Control Unit	**0**	1	2	3	4	5
Sales Unit	**0**	1	2	3	4	5
Legal Unit	**0**	1	2	3	4	5
Credit Cards Unit	**0**	1	2	3	4	5
Collection Unit	**0**	1	2	3	4	5
Treasury Unit	**0**	1	2	3	4	5
Human Resources Unit	**0**	1	2	3	4	5
Brokerage Unit	**0**	1	2	3	4	5
Administrative Support Unit	**0**	1	2	3	4	5
Finance Unit	**0**	1	2	3	4	5
Internal Audit Unit						

7. How **often** do you share your **expertise** in **face-to-face** interactions with employees of the following units?

0 never
1 once every few months
2 once a month
3 once a week
4 twice a week
5 daily

	never	once every few months	once a month	once a week	twice a week	daily
VIP Unit	**0**	1	2	3	4	5
Business Unit	**0**	1	2	3	4	5
Customer Help Line Unit	**0**	1	2	3	4	5
IT Unit	**0**	1	2	3	4	5
Branches Unit	**0**	1	2	3	4	5
Accounting Unit	**0**	1	2	3	4	5
Internet Unit	**0**	1	2	3	4	5
Operations Unit	**0**	1	2	3	4	5
Consumer Sales Unit	**0**	1	2	3	4	5
Local Loans Unit	**0**	1	2	3	4	5
Credit Unit	**0**	1	2	3	4	5
Loss Control Unit	**0**	1	2	3	4	5
Sales Unit	**0**	1	2	3	4	5
Legal Unit	**0**	1	2	3	4	5
Credit Cards Unit	**0**	1	2	3	4	5
Collection Unit	**0**	1	2	3	4	5
Treasury Unit	**0**	1	2	3	4	5
Human Resources Unit	**0**	1	2	3	4	5
Brokerage Unit	**0**	1	2	3	4	5
Administrative Support Unit	**0**	1	2	3	4	5
Finance Unit	**0**	1	2	3	4	5
Internal Audit Unit	**0**	1	2	3	4	5

8. How **often** do you **use e-mails and/or memos** for sharing your **expertise** with employees of the following units?

0 never
1 once every few months
2 once a month
3 once a week
4 twice a week
5 daily

	never	once every few months	once a month	once a week	twice a week	daily
VIP Unit	**0**	1	2	3	4	5
Business Unit	**0**	1	2	3	4	5
Customer Help Line Unit	**0**	1	2	3	4	5
IT Unit	**0**	1	2	3	4	5
Branches Unit	**0**	1	2	3	4	5
Accounting Unit	**0**	1	2	3	4	5
Internet Unit	**0**	1	2	3	4	5
Operations Unit	**0**	1	2	3	4	5
Consumer Sales Unit	**0**	1	2	3	4	5
Local Loans Unit	**0**	1	2	3	4	5
Credit Unit	**0**	1	2	3	4	5
Loss Control Unit	**0**	1	2	3	4	5
Sales Unit	**0**	1	2	3	4	5
Legal Unit	**0**	1	2	3	4	5
Credit Cards Unit	**0**	1	2	3	4	5
Collection Unit	**0**	1	2	3	4	5
Treasury Unit	**0**	1	2	3	4	5
Human Resources Unit	**0**	1	2	3	4	5
Brokerage Unit	**0**	1	2	3	4	5
Administrative Support Unit	**0**	1	2	3	4	5
Finance Unit	**0**	1	2	3	4	5
Internal Audit Unit	**0**	1	2	3	4	5

PROFILE

9. Where is your unit located? Please mark one the following:

[redacted]

[redacted]

[redacted]

[redacted]

- ( ) Branches
- ( ) Other

10. What is your job category? Please mark only one of the following:

- ( ) Senior staff
- ( ) Junior staff

11. What is your highest academic or professional qualification? Please mark only one of the following:

- ( ) High school/Secondary School Certificate (SSC)
- ( ) 2-3 year certificate or diploma after high school/Secondary School Certificate (SSC)
- ( ) Bachelor or any equivalent qualification
- ( ) Master's or higher degree
- ( ) Other, please specify: _____

12. Please indicate your nationality (scroll box):

[redacted]

- ( ) Other Arabs
- ( ) Indian
- ( ) Western Expatriate
- ( ) Other

13. Your gender:

- ( ) Male
- ( ) Female

14. Your age group (scroll box):

- ( ) 20 and below
- ( ) 21 to 30
- ( ) 31 to 40
- ( ) 41 to 50
- ( ) 51 and above

15. Which of the following communication channels do you mostly use in your work environment? (scroll box)

Please rank the following options from 1 to 6

1 being the channel you use the most

6 being the channel you use the least

- ( ) Face to face
- ( ) E-mail
- ( ) Telephone
- ( ) Conference calls
- ( ) Fax
- ( ) Discussion groups/Meetings

APPENDIX C

MODIFICATIONS TO WEB SURVEY

Using Pilot Study for Modifications in the Online Survey

A pilot study was conducted prior to the official launch of the survey to make sure that the language used was clear and the questions were understood by employees. One important consideration was that employees from diverse backgrounds of nationality and language comprehend the questions uniformly. In addition, time to be consumed in completing the survey was considered to a critical factor by the management. The management made it clear to the researcher that employees had little time to fill out the questionnaire because of their being over-occupied in work, and this factor could have a significant effect on the response rate. The pilot study was also intended to make sure that the Web site posed no technical or practical snags in terms of layout, navigation, and storage of data.

Ten employees, coming from those organizational units that did not participate in the study, representing typical respondents of the study, and also having a natural mix of diverse nationalities completed the questionnaire as part of the pilot study.

The participants made the following comments and observations:

- The cover letter seemed to be long and crammed. It gave a negative impression and might discourage many participants even reading it. In such a case, it was highly unlikely that they would go any further in opening and answering the questionnaire.
- Time was wasted unjustifiably on those repetitive questions where there existed no relationships between the participants filling the survey and employees of some units. Once it was indicated, the participant must not be asked to fill the same answer of “No relationship.”
- Questions 7 and 8 were not clear in terms of language and needed to be rephrased.

- Respondents faced difficulty when they could choose more than one option for some questions for which they were expected to choose only one.
- There was a chance that a respondent might answer part of a question and leave other parts on the same page unanswered.
- Some respondents could not see the submit button on the cover page that guided them to the survey instrument because of their screen resolution.

In response to those comments, the researcher had follow-up interviews with four to clarify some of the comments they had made. Finally, the following actions were taken to improve the instrument:

- The cover letter was revised and some paragraphs were omitted so that the final version was shorter, simpler and less congested. It was designed in a way to help respondents move to the actual survey as quickly and with as little effort as possible.
- A loop that linked Q1 and Q2 and Q3 and Q4 was programmed (Q1 and Q2 cover business relationships while Q3 and Q4 cover social relationships). This loop saved respondents from having to fill the option *no relationship* in Q2 and Q4 if he/she had chosen that option already in Q1 and Q3.
- Q7 and Q8 were revised and rephrased. As a result, these questions were short, simple, straightforward, and comprehendible.

A blocking mechanism was programmed in the survey that did not allow a respondent to proceed to the next question if he had not completed all the fields in the previous question. A pop-up window would appear with a message asking the respondent to kindly

- fill in the specific field that had been missed. These messages appeared for every missing field till all fields were filled.

- Only one response was allowed in each field. Choosing another response would automatically delete the previous. This mechanism was included in the profile section as well after it was realized that some respondents in the pilot study had chosen two answers, which would lead to invalid responses. A "radio button" mechanism was installed for all eight questions that allowed only a single response. Erasing previous answers required clicking an alternative button. A program was created in the profile section to allow one answer only.
- Each question appeared on one screen.
- A brief *"help"* page followed the cover letter, which guided respondents in navigation and exit options and in their choice of fields.
- Use of color was minimal and consistent so that readability was enhanced and navigational flow was unconstrained.
- The questionnaire's configuration was manipulated to allow the display of a whole page regardless of the screen configuration.
- A left margin was created to show and convey a sense of where the respondent was in the response process by changing the colors of each completed question. In addition, respondents could navigate back to the previous questions, regardless where the cursor would be on the page.

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